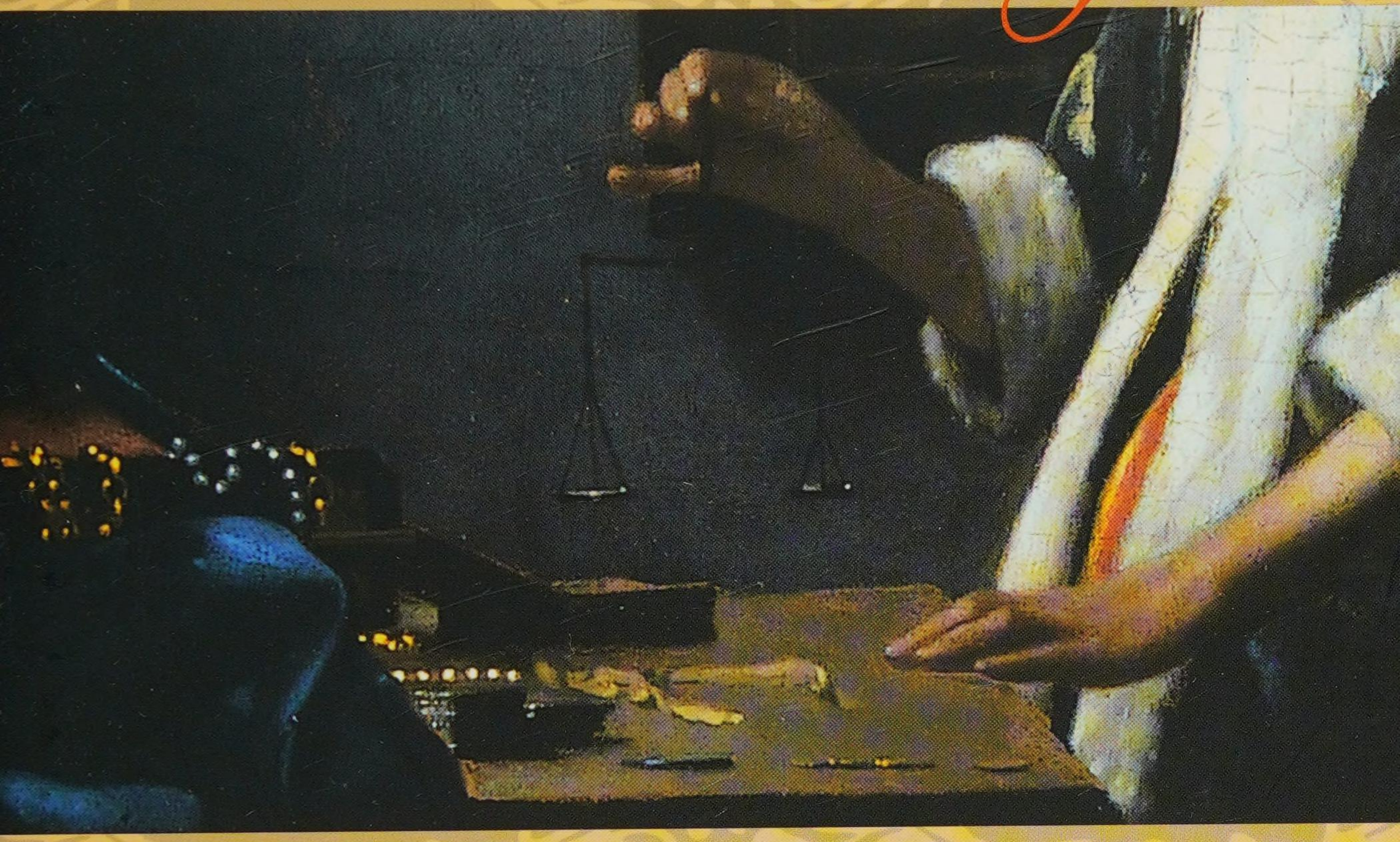
# Tables of Knowledge

## *Descartes in Vermeer's Studio*



Harriet Stone

*Descartes* believed that his analytic model applied to all fields of research and that all branches of science lead to truth. His many analogies with literature and art notwithstanding, Descartes offers an entry into knowledge that fails nevertheless to take into account how in the seventeenth century Dutch painters such as Vermeer similarly order a view of the world by concentrating on the properties of individual objects. Descartes's celebrated scientific method offers a protocol for conducting experiments; Harriet Stone argues that this method can also serve as a guide for classifying the findings obtained from experiments. *Tables of Knowledge* shows that Dutch genre paintings and still lifes enact in visual form a process of recording information similar to that of science, with intriguing results.

Stone investigates such diverse topics as seventeenth-century advances in optics and the attendant explosion of data about the natural world; the proliferation of material goods in prosperous Dutch homes; and the compelling realism of Golden Age paintings.

Vermeer and his contemporaries, she contends, transform a potentially threatening consumerism into the viewer's aesthetic pleasure. The artists' depictions of rooms where framed images and maps adorn walls and where fruit, shimmering glassware, gold pieces, and other precious items are set out on tables constitute an inventory of middle-class life. Appealing to both the eye and the mind, Dutch paintings convey meaning by accentuating the luxury of objects displayed in all their specificity. While not without

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HARRIET STONE

CORNELL UNIVERSITY PRESS

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For Izaak Wirszup

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# PREFACE

## Visual Dimensions of Thought

An image of the bold new Seattle Central Library by Rem Koolhaas attracted my attention as I was nearing the end of my work on this book (plate 1). With its exterior walls divided into diamond-shaped glass panes by a metal frame that runs across their surfaces like a fishnet skin, the library offers in three dimensions a compelling model of a table of knowledge with its signature category divisions and subdivisions. These frame our understanding of the relation of part to whole to suggest the causes that underlie the order that we assign to things. An article in the *Seattle Times* announcing the new library's opening quotes Joshua Ramus, one of the designers who worked on the project, who offers an intriguing assessment of Koolhaas's innovative architectural design: "A truly rational building will not look rational."[1] I was intrigued. My book concerns the formation of knowledge in the seventeenth century, a period devoted as never before to rationalism, the acquisition of truth through the exercise of reason, the mind's capacity to judge. I analyze the visual dimensions of thought through an examination of how Dutch art informs Descartes's science. I explore the "rational look" of early modern culture evident in the design of its ideas.

*New York Times* architecture critic Herbert Muschamp, ecstatic in his praise of Koolhaas's library, further elaborates: "The site is steeply raked. Its four elevations are different; the profile changes constantly. Tapered facets create the effect of forced perspective, altering the apparent dimensions of the building envelope. Planes that initially look rectangular are seen on closer inspection to be trapezoidal."[2] Solid yet fluid; geometric yet irregular; levels stacked like boxes, yet views that spontaneously metamorphose with every change in the sky: all of these attributes sup-

port the library's function as a repository of knowledge that takes us from the established ideas of the past toward future discoveries which will cause us to reconceive them. The assemblage and ordering of facts, the assignment of individual pieces of information into categories, is reflected catalog-like in the gridding of the library's surface. Divided into five stacked structures that house the different "zones" of the new library's activities, the architecture models the ordering of information that lies at the heart of all intellectual investigations.

In the seventeenth century René Descartes theorized extensively about the human capacity to reason.[3] Knowledge requires accurate observation and logical deductions. Descartes particularly stressed the latter, convinced that improved (more systematic) analyses increase one's ability to know, to predict, and thereby to control nature. He described how the mind filters what the eye sees, translating sense perceptions into ideas. Descartes held that man's ability to reason would allow him to establish the truth, or, as I prefer to emphasize with a capital letter in this first elaboration of the concept, the Truth, a complete and unified understanding of all things in the world. Believing that a limited number of simple natures make up all of our understanding, Descartes argued that the diversity of objects reflects the diverse compositions of these simple natures.[4] He was not alone in inventorying the world. His study of the composition of things parallels the work of some of the seventeenth century's other most influential figures. I believe that Descartes shared a vision with artists, in particular Dutch artists such as Johannes Vermeer, whose realistic depictions of what they observed constitute a veritable catalog of the things of the world. Descartes and Vermeer similarly filtered their impressions of things into explicitly crafted representations that inform us of both a certain content—the *what* of knowledge—and the intricacies of classification—the *how* of knowledge. The latter, I contend, has particular value for our appreciation of Descartes's science of method as art.

Descartes lived in the Northern Netherlands from 1628 to 1649 (with several changes of address) and published the *Discours de la méthode* [*Discourse on the Method*] there in 1637. His works were well integrated into the curriculum of Dutch universities by the 1670s.[5] Although these facts serve to remind us that Descartes's influence was not limited to France and that France had an important role to play in the history of the Netherlands, they do not in themselves justify my dual focus on Descartes and Vermeer.[6] The French philosopher never met the Dutch artist; his texts had

no direct influence on the Dutch master's paintings. Vermeer's art has more immediate roots in van Eyck's *Arnolfini Portrait* (1434, National Gallery, London) (plate 2) and Velázquez's *Meninas* (1656, Museo del Prado, Madrid) (plate 3) than in Descartes's *Discours de la méthode*. Yet Descartes's interest in the interaction of light and matter evolved along with that of Dutch researchers such as Huygens in the north, where the science of optics and the art of perspective were closely allied. Both the use of improved lenses for microscopes and telescopes in the scientific community and the artists' efforts to capture things on canvas just as they appear in the light and register in the eye, sometimes with the aid of optical devices, bring weight to bear on the association of Descartes's *Discours* with Vermeer's oeuvre, for the *Discours* included Descartes's *Dioptrique* [*Optics*], a study of light, refraction, and the eye.

This well-documented history offers important background to my book. My focus, however, lies further afield, not in optics but in epistemology and taxonomy. The latter designates not a tedious practice of cataloging things, a purely descriptive activity through which one places all similar objects in the same box, but rather the highly theoretical and speculative process of elaborating relations among the boxes themselves. In a defense of the "scientific vitality of taxonomy" Stephen Jay Gould argues: "All systems of classification must express theories about the causes of order, and must therefore feature a complex mixture of concepts and percepts—that is, preferences in human thinking combined with observations of nature's often cryptic realities. Good taxonomies may be analogized with useful maps, but they reveal (as do all good maps) both our preferred mental schemes and the pieces of external reality that we have chosen to order and depict in our cartographic effort."[7] The point, Gould goes on to explain, is not that knowledge is always relative. Over time, some taxonomies are rendered invalid, and new ones replace them. The question remains, therefore, whether science as conceived through Descartes's method can, as the philosopher believed, express the truth about nature. Is there something irreconcilable in Descartes's search for truth and his preferred reliance on logic, indeed, on the very logic of his *Discours de la méthode*?

The relationship between Descartes and Vermeer offers fruitful terrain for my investigation, all the more so because neither the French philosopher nor the Dutch artist devoted himself explicitly to taxonomy and the concerns that I address. Both men allow us to focus on early modern European culture as it established, and did not simply theorize, a body of

knowledge. Interestingly, we detect signs of weakness in the structuring of knowledge even as Descartes and Vermeer, each in his own way, celebrate the power of reason. The problem hinges on a distinction between first-level representation (thoughts) and second-level or meta-representation (text, image). Descartes intends his *Discours de la méthode* as a guide to future research and as testimony to his critical role in moving science out of error by insisting on a few basic principles. A study of Vermeer's paintings lets us see, however, that the same methodological principles that Descartes develops for analytic thinking actually thwart his ambitions when the object switches from his thoughts about nature to his narrative (discourse) of his discoveries. Both the initial analysis, the process by which Descartes explores the world through clear and distinct ideas, and his eventual account of this procedure in the *Discours de la méthode* depend on the basic rules of method that he articulates: (1) affirm as true only those things that are true, and that can be argued clearly and distinctly; (2) present ideas systematically, breaking complex ideas into smaller units; (3) build from the simple to the more complex; and (4) be careful to omit nothing that would distort the findings (*Discours,* AT 6:18–19). Descartes describes only the first application; he advocates a universal method applicable to all branches of science. I submit that the application of the method to his narrative is also critical to our appreciation of the possibilities for knowledge in the classical period.

Understood as a system of classification for evaluating cultural production, that is, the ways in which texts and images devise strategies for imposing ideas, the method dooms the search for truth. In making this claim I am not stating that Descartes conceived his own research in terms of the criteria that I invoke to evaluate the formation of knowledge in the classical period. I am suggesting that attempts in the early modern period to codify knowledge were ultimately frustrated, and that the roots of such frustration lie largely undetected in Descartes's *Discours de la méthode*. We do not find an actual table of elements in the *Discours*; nor do we find there advice on how to construct such a taxonomy. Yet to understand how texts and images, artifacts of classical culture, reveal the possibilities for ordering knowledge, we need to begin with Descartes. I read his texts through the lens of Dutch genre paintings, artists' scenes of everyday life. Replete with objects, the Dutch images flesh out a view of the world whose diversity effectively mediates Descartes's idea of the unity of knowledge based on a few simple natures.

Other writers and artists contributed to the body of information that

we have inherited from seventeenth-century Europe. But none does more to inform our view of how knowledge develops, the logic on which meanings depend, than Descartes. Rejecting all criteria (norms) for action external to thought, including justice, goodness, and even, to a large extent, God, Descartes releases science from ancient orthodoxy, from all traditional forms of knowledge. He opens science to analyses based specifically on the things that it analyzes rather than on established ideas. Peter Schouls notes that Descartes "stresses again and again that it is reason only [that] determines what is and what is not characterized by certainty, what is or is not clear and distinct, hence absolutely certain and true."[8] Descartes means to establish the procedure that will preclude any lingering doubt about the identities that we assign to things; he seeks a method that will establish as true and irrefutable the facts, or base elements, of our understanding.

Descartes poses the problem of representation in his separation of mind and body. In this context *representation* refers to objects perceived as *thoughts* in the mind. Exploring the mind's function as the center of reason and consciousness as a state of knowing one's thoughts, Descartes focuses on the ways in which the mind conceptualizes things in nature. He believes that knowledge gained in this way will improve mankind's understanding and control of the world. But an understanding of *how reason works* does not guarantee an understanding of *what reason produces,* actual representations, real texts and images. The latter, I argue, is subject to the same rules of method that Descartes outlines as constituting the basis for science. The fact that he ignores this second application of the method reflects his unshakable conviction that an understanding of reason will generate only reasonable acts. The capacity for individuals to act reasonably notwithstanding, textual and visual representations from the seventeenth century, including Descartes's own *Discours,* do not simply flesh out experience incrementally. A text may evoke the deepest meanings of life, but it cannot subsume all of life to its forms. Indeed, the act of subsuming things, the classification of individual identities into more general categories, best characterizes how texts and images establish a particular knowledge as part of a larger body of information. Descartes maintains that all of human knowledge emerges from a chain of reasoning organized through dedication to a single principle, namely, universal mathematics. Against this notion of *unicité* [unicity, oneness], however, representation instead models, synecdochically, the relation of part to whole.

Descartes invokes the method to explain how reason, the individual's capacity to work through a simple to a more complex understanding and from a limited to a supposedly limitless knowledge, offers the promise of the (unique) truth. Yet Dutch genre painters instead inform us that representation produces only multiple, restricted truths. Representation depends not on an idea of infinity, a boundless space through which to express the whole of experience, but rather on frames within frames, carefully delimited categories through which we measure both the expanse and the limits of ideas. Conceived as a system for classification, representation therefore marks the limits of Descartes's method for science. Through their minutely detailed compositions, Vermeer and his contemporaries offer evidence of the logical complications and inconsistencies that threaten Descartes's goal of truth as he moves science from method and experiment to an eventual record, that is, the methodical representation of his discoveries.

The philosopher and the artist represent two distinct categories of knowledge, yet they both focus on the identification of objects through the observation and identification of the elements that constitute them, the interrelation of these parts, as well as the relation of the original object to other objects similarly analyzed. Although an affiliation with science was by no means their explicit aim, Dutch artists provide through their exquisite renderings of objects a record of their world in much the same way that scientists offer an explanation of natural phenomena. Moreover, when we read a painting for its symbolism, for its reflection of or resistance to moral values, or for its realism, we are interpreting elements based on their arrangement within a composition. Underlying the narrative function that has us "read" the connection between pearls and purity in a Dutch painting, or between Chinese porcelain and exoticism, is the fundamental process of naming. The painter must first identify the object not as a pearl or as a porcelain bowl simply, but as a pearl or a bowl that acquires a particular meaning through the associations he establishes with other objects in his painting. Pearls and Ming china become signs of wealth and the rise of the middle class in the Dutch Republic. In composing his painting, the artist mirrors the philosopher, who orders and measures the elements of nature that he uncovers. Both science and art, both text and image, therefore, represent the grid of associations that the mind constructs as it processes experience. Although neither Descartes nor Vermeer thought of what he did in these precise terms, their

work models the careful articulation of relations within a table of elements.

Dutch genre paintings and still lifes offer compelling models for studying Descartes's method. Through them we obtain a more broadly based knowledge of the seventeenth century, one informed not just by science but by culture generally. I trace this culture in northern Europe as it extends from the court-regulated society of France early in the seventeenth century to the expanding and commercially successful middle class in the Dutch Republic during the years that span Vermeer's lifetime, 1632–1675. In their depictions of everyday life, Dutch artists, like Descartes, rely on observations of the world. They take their inspiration not from history, the great stories and ideas inherited from the past, but rather from familiar scenes, typically of city life. Genre painters often portray interiors, domestic settings in which objects as much as figures afford a view of the middle class. Scenes of music lessons, letter writing, food preparation, mothers tending their children, painters in their studios, maids working and sleeping, a soldier's visit during the master's absence, seduction, carousing guests, and women with their jewels are set in rooms whose precisely rendered tables, chairs, carpets, floors, glassware, flowers, vegetables, and the like order a sense of life by displaying it for the viewer one item at time.

Among the many Dutch genre painters, Vermeer clearly stands out for his ability to present a visual taxonomy. Vermeer cultivates an eminently rational art. His works reflect his precise mastery of the rules of perspective as well as his perfection of the compositional ideas and stylistic innovations of Fabritius, de Hooch, and Maes. Vermeer developed a "flawless" naturalistic technique.[9] His resplendent images evidence superior skills, but they also record a more observant eye, a more penetrating gaze. In Vermeer we discover an intellectual painter who attends to the subtleties of visual expression through a geometric, rational composition. While all artists use technique and composition to interpret the world, Vermeer remains a particularly lucid interpreter thanks to his masterly detailing as well as his refined style, his heightened realism. Arthur Wheelock stresses that Vermeer's technical proficiency does not explain his genius but rather serves as a vehicle for it:

> Vermeer was an extraordinary craftsman who carefully conceived and structured his compositions to achieve the purity of expression he sought to convey. He had great sensitivity to optical effects found in the world about

him, and he translated these in his paintings through his use of light and color. He mastered a wide range of painting techniques to allow his vision to take visual form, which, when analyzed, provide extraordinary insights into Vermeer's pictorial ideas. Vermeer's craftsmanship was not an end in itself, however, but rather a means toward creating a work of art that conveyed a mood, introduced abstract ideas, or otherwise reflected upon some aspect of human experience. Many of the scenes he chose to depict are those encountered in daily life, passing moments seemingly of little consequence. In his hands they take on almost metaphysical significance.[10]

Unlike Descartes, Vermeer does not attend to theoretical or practical solutions to life's problems. He designs paintings to please himself and his patrons; his standards are those of taste and beauty. He is not concerned with improving the physical conditions of human existence other than by providing pleasure through visual stimulation, and, for the lucky few who own his works, through the power of acquisition.[11] Art, however, changes material culture, making it something more than a base consumerism. The "something more" derives, of course, from the transcendent qualities of objects, ordinary and extraordinary, that the artist transforms into things of enduring appeal. It also relates to the notion of collecting, as this refers to the eminently scientific practice, enjoyed as well by wealthy Dutch burghers, of assembling specimens and organizing data, that is, to the process of amassing knowledge.[12] If the Dutch suffer, in Simon Schama's apt phrase, from an "embarrassment of riches," art mitigates their unease by conceiving the objects of their world as works that please both the eye, through their visual qualities, and, more subtly but no less significantly, the mind.[13] Vermeer's exquisite mastery of his subjects speaks clearly, if silently, through images rather than words, to the power of reason, intellect, and the fullness of art to shape a view of reality. His vision therefore helps inform our understanding of Descartes's ambitions to change the foundation of knowledge.

One might object that French academic painting offers a more obvious pairing with Descartes, and one more suitable for a study on the ordering of knowledge, since classical academic doctrine held that painting appeals to reason or the mind before it appeals to the eye.[14] I have elected to look at Vermeer's art precisely because it avoids a particular feature of French academic painting, namely, the idealization of Greek and Roman works. The problem concerns not merely the particular style of French art but also the notion that the ideal is expressed through a reverence of antiquity as it was used to translate the ambitions of a French monarchy

intent on concentrating its power.[15] Like all other aspects of seventeenth-century French society, officially sanctioned art—that of the Royal Academy and other court commissions—served the needs of the state by idealizing it. I do not mean to diminish the importance of such art, the classical texts from which it drew inspiration, or the contribution of this art to the culture of the period. But an investigation into the epistemological underpinnings of the seventeenth century requires that we strip away as many of its ideological trappings as possible. In France there were notable exceptions outside the academy, such as the Le Nain brothers, whose paintings of the daily life of peasants mirror some of the realistic details of Dutch works.[16] Most of the recognized works by French artists in this period, however, were not based on observation to the same degree that Dutch genre paintings and still lifes were. For these Dutch artists the line of sight was mediated more by magnifying instruments than by histories cultivated to magnify the glory of the monarchy. To be sure, Dutch painters had to be sensitive to their own political environment, fraught with its own tensions. Catholics and Protestants coexisted with considerable strife. Moreover, economic power originating in foreign imports caused major powers to vie for a share of the world market. Wars with the Spanish and French severely affected the life of Dutch citizens.[17] Nevertheless, in offering a view of daily existence that was for the Dutch themselves replete with these social overtones, Dutch artists more clearly replicated Descartes's eye on the world than did, for example, Poussin, who, although he avoided serving the self-aggrandizing projects of the crown, frequently adopted biblical and mythological themes.[18]

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This book focuses on the strategies that Descartes and Vermeer develop to organize information. We glean from these strategies an idea of culture that transcends disciplinary and national boundaries. I speak of the results as forming a table of elements, a structure for articulating the combinations of elements, the possibilities for knowledge, that is informed by science and by art. The table of knowledge to which I refer in my title, a reference to a full taxonomy of all the things in the world, exists only as an idea, a way of describing the ordering of knowledge in the seventeenth century. Neither Descartes not Vermeer offers an actual table of elements, a representation designed specifically to function as a taxonomy. Nor do I propose any tree diagrams to aid my reader. Rather I

invoke the table of knowledge as a metaphor for the representation obtained when all data collected from various sources related to science as well as the arts assume a final order. I refer to the "identity" of things as a classifiable fact or smallest unit of this imaginary table through which we understand the classical period.

Anthropologists have long observed that taxonomies are generally embedded cultural systems that include social practices, values, and beliefs.[19] Neither science nor art, nor any other discipline, develops in a cultural vacuum. Although authors and artists may claim a certain objectivity or neutrality in affirming a particular order of things, we inevitably detect traces of the influences of Church and State in their works. By associating science and the arts, however, I am concerned less with showing that science fails to be objective and universal than with affirming that knowledge is not the sole domain of science. All intellectual and social practices inform us of the possibilities for structuring knowledge within a given culture, whether early modern or our own. Viewed in this context, and specifically in conjunction with Vermeer's art, Descartes's method, though it effectively guides the experimental phase of observation and analysis, appears to offer a flawed system for obtaining the truth. Once again the Seattle Central Library helps us to visualize the problem. Its irregularly shaped planes create a structure that, despite its mass, suggests a certain fluidity. The rigors of the method notwithstanding, for the seventeenth century, too, the classification of identities remains highly complex. The very complexity of the table ultimately speaks against Descartes's view of the "unicity" of knowledge. Indeed, I argue that the same logic that orders identities into a table of knowledge also demonstrates the limits of the order that it sets in place. The question becomes: How do we account for the need to retain some fluidity in the table of knowledge in light of the seventeenth century's emphasis on reason, order, truth, on the absolutes of intellectual progress that Descartes champions in the *Discours de la méthode*?

Well before Linnaeus and the formalization of taxonomy in the eighteenth century, indeed, well before the seventeenth century, the accumulation of information required a system for processing it.[20] The table of knowledge as a metaphor for an organized collection of information is as old as man. Aristotle and Pliny, for example, both develop compendia of natural history with clearly demarcated "taxonomic" divisions.[21] Principles of logic, moreover, ground any system of classification. Furetière's

seventeenth-century dictionary of contemporary French usage defines *logic* as the

> science qui enseigne à bien perfectionner le raisonnement, qui donne des regles certaines pour definir, diviser & argumenter. Aristote est le pere de la Logique, celuy qui a le mieux escrit de la Logique. Il y a eu plusieurs Logiques modernes. La Logique de Port Royal, la Logique de l'Abbé Mariotte, &c.
>
> [science that teaches how to perfect reason, that gives specific rules for defining, dividing, and arguing. Aristotle is the father of logic, the one who best wrote about logic. There were several types of modern logic. The *Logic of Port Royal,* The *Logic of Father Mariotte,* etc.][22]

The notion of plural logics, of multiple strategies, is important. It underscores the range of possibilities for ordering information that exist at any given time. In the seventeenth century, philosophers such as Descartes substituted mechanical explanations for preexistent teleological explanations. Scientific systems, which were based on a rigorous (logically inviolable) analysis, differed significantly from theological systems. Science increasingly emphasized man's capacity to expand his control of nature through his ability to reason, whereas religion found answers in God, and in a certain *unknowing,* that is, via arguments offering "proof" that certain things lie beyond man's capacity to understand them. Despite these obvious differences, however, science and religion remained intertwined. Even Descartes, the great proponent of reason, was careful to insist that if the universe followed simple rules, just as a mechanical device relies on certain basic operations, it was because God designed it that way.[23]

Though logically incompatible, both the religious and the profane—the belief in signposts from God and the focus in both science and the arts on (human) access to the elements that determine experience—prevailed in European society. The Neoplatonic idea that a static and eternal set of correspondences in nature reveals the harmonious order of God's creation does not simply disappear in the classical period. Many continued to believe that once science uncovered these relationships it could exploit them, improving both the spiritual quality of life, through greater access to divine wisdom, and physical conditions, through the development of new machines and medicines. In the seventeenth century writers and artists reserve a prominent place for God's agency in their formu-

lations. Yet the new intellectual energy that distinguished this period in Europe reflects confidence in mankind's own capacity to configure a world and to set this representation down on paper and on canvas for all to see. Omniscience had become a human aspiration, measurable in the numerous representations that asserted the power of the mind to set the table of knowledge. No instrument—no lens—proved more critical than that of the mind as it engaged with nature and made it signify. This concept holds as much for science as it does for art, as much for Descartes as for Vermeer.

Descartes's commitment to rational explanations, his eloquent defense of reason, marks a turning point in the history of ideas. Descartes was not alone in propelling history forward. But his work, notably in the *Discours de la méthode,* proves exemplary because it provides a critical model for assessing the classical period's dedication to analysis. Descartes takes as his subject not only specific aspects of his physics but also, more generally, the organization of science as a discipline for exploring the world. I invoke the term "science" to mean the application of strategies, particularly mathematical principles, to experiments; the explanation of phenomena; and also, as I develop the concept in this book, the compendium of data that results.[24] Descartes is not a modern-day Pliny, however. Pliny's natural histories are syntheses of information gleaned from an extensive array of sources.[25] He included the marvelous in his descriptions, combining discussions of the real with discussions of the imaginary or supernatural.[26] Descartes rejects the fantastic and attends only to real phenomena such as the motion of the planets and light. Yet he uses fables, allegories, analogies, and other "fantastic" or purely rhetorical elements to describe his discoveries. He thus stands less opposed to literary authors and artists than might first appear, or than he might wish to be.

Whatever their subjects, artists must conform to established rules and methods for perfecting their craft. Furetière's dictionary links science, method, and art: "[L'art] est principalement un amas de preceptes, de regles, d'inventions & d'experiences, qui étant observées, font reüssir aux choses qu'on entreprend, & les rendent utiles & agreables" [(Art) is principally a set of precepts, rules, inventions, and procedures which, once observed, ensure the success of what one undertakes and makes it useful and pleasing]. Art posits beauty as its own truth, not because it confirms a specific reality but because it satisfies by affirming the beliefs, values, and traditions of individuals and societies. Pleasure in this context does

not accord with a purely sensual experience. Just as a literary narrative both entertains the reader and influences his understanding of the world, so a painting pleases the eye and also the soul and/or the mind of the observer. The ability of art to communicate this way depends, Furetière suggests, as with science, on the mastery of certain principles, the logic of the discipline that includes perspective, the use of forms and colors, and so on.

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Attending to the interplay of science and art, we find that they share an emphasis on structure, a well-ordered design. The table of knowledge that we construct for the seventeenth century needs to reflect its major paradigms. It must also account for the sustained evolution of thought, the ways in which science and art impose modifications on, or expose the weaknesses of, such paradigms. To posit that Descartes's notion of a complete, unique, and totalizing representation of the world remains unattainable in no way detracts from his enormous contribution to science and to the "cult of reason" that in many ways grounds the classical period. The inevitable elusiveness of truth does not mark the failure of those, like Descartes in the seventeenth century, who dedicate themselves to pursuing it, for they leave behind a wealth of knowledge. Our understanding advances steadily, if only because negative results (the perception of limits) advance the cause of knowledge even as they defeat the search for absolutes.

I am critiquing not Descartes's *method* as a theory so much as his *discourse* as a practice. His conception of a rigorous scientific protocol applies as much to his written account of his discoveries as to his original analysis. For every problem conceived and every experiment undertaken there remains the added task of recording the results. The philosopher must order his findings in such a way as to validate them for his reader. This process involves a methodical demonstration of both what he has uncovered and why, based on these facts, his ideas extend or supplant existing ideas. The final record must set out for the reader how each element of his findings connects with all other elements, like so many branches of a tree diagram. Descartes effectively supplants the tree of knowledge that God gave to Adam and Eve with an elaborate taxonomy comprising the different branches of science, all of which, he holds, contribute similarly to the search for truth. Rather than replicate an order of Creation constructed analogically to reflect the mirroring of the micro-

cosm (earth) with the macrocosm (universe), man with God, Descartes looks to establish a comprehensive knowledge based on the different identities of things. He speaks, however, not of tables but of the act of creating a tabula rasa.

Although people do not tear down homes in a city simply because they desire a new look or want to upgrade the area, they do, Descartes observes, raze buildings whose foundations are weak and in danger of collapsing. Descartes uses this example to introduce a distinction between positive and negative change. Politically, he remains cautious. He does not, he claims, advocate a revolution whereby a rebel "fît dessein de réformer un État en y changeant tout dès les fondements" [plans to reform a State by changing everything in it from the bottom up] (*Discours,* AT 6:13). Descartes restricts his revolution to science. Careful to challenge only scientific theories, he recalls his earlier commitment:

> Pour toutes les opinions que j'avais reçues jusques alors en ma créance, je ne pouvais mieux faire que d'entreprendre, une bonne fois, de les en ôter, afin d'y en remettre par après, ou d'autres meilleures, ou bien les mêmes, lorsque je les aurais ajustées au niveau de la raison.
>
> [For all the opinions that I had learned up to that point I could do no better than to peel them away once and for all in order to establish in their place either other, better ones or the same ones once I had adjusted them by applying the principles of reason.] (*Discours,* AT 6:13–14)

Descartes's urban architecture analogy enables him to explain his theory in terms of the solidity of design, systematic planning, and the inadequacy of present knowledge. These ideas sustain much of his writing, where he attempts to advance the cause of knowledge by introducing an analytical model based on the concept of order and regularity. He argues against change for the sake of change and for an essential new approach that will allow science, whose foundations he deems weak, to advance with assurance. The elements that he will incorporate into science are products of his reason—either new facts, or old assumptions elevated to the status of facts after he has analyzed them and subjected them to systematic doubt. Descartes proposes to build, on a new and more solid foundation, an improved science that will direct future teaching and research. Although he will ultimately undercut traditional academic views, his stated goal is not the rejection but rather the refinement of existing theories. In place of existing opinions, he will offer rigorous proofs based on mathematical models.[27]

Descartes was not alone in focusing on reason rather than on faith. In England, Francis Bacon sought to reconstruct the sciences, arts, and all human knowledge.[28] Bacon explicitly outlines a compendium of knowledge. We find nothing in Descartes's writings equivalent to Bacon's elaboration in the *Novum Organum* of an overview of all the natural sciences and their division into different branches, a structure that was to have a tremendous influence on the French Encyclopedists.[29] Nevertheless, by stipulating the goal of his research to be a universal science, one that brings together information from different scientific disciplines, Descartes's emphasis on *unicité* sets the groundwork for a taxonomy. In the *Rules* he argues:

> For, given that all the sciences are nothing but human wisdom, which always remains one and the same, however different the objects that it endeavors to study, and that it is no more changed by these objects than the light of the sun is changed by the various things that it shines upon, there is no need to impose any limits on the mind: knowledge of one truth does not, in effect, prevent us from discovering another truth, just as the practice of one art does not hinder us from learning another, but rather aids us in learning it. . . . We therefore need to understand that the sciences are so interconnected that it is easier to learn them all together than it is to isolate one from the others. If someone wants seriously to seek the truth, therefore, he must not elect to study one science in particular, for they are all united and interdependent. (*Rules* 10.1, 360–61)

Descartes does not ignore but rather attempts to go beyond the divisions among the various branches of science in order to underscore the essential role of reason critical to them all.[30] I submit that in offering a methodical approach for identifying the unknown, he theorizes a process of ordering and measuring that sets up the possibility of a taxonomy as comprehensive as that which Bacon proposes. Insisting on the logical sequencing of ideas, Descartes in effect frames a table of knowledge. He allows us to appreciate how one delineates the connections between things:

> Ces longues chaînes de raisons, toutes simples et faciles, dont les géomètres ont coutume de se servir, pour parvenir à leurs plus difficiles démonstrations, m'avaient donné occasion de m'imaginer que toutes les choses, qui peuvent tomber sous la connaissance des hommes, s'entre-suivent en même façon, et que, pourvu seulement qu'on s'abstienne d'en recevoir aucune pour vraie qui ne le soit, et qu'on garde toujours l'ordre qu'il faut pour

les déduire les unes des autres, il n'y en peut avoir de si éloignées auxquelles enfin on ne parvienne, ni de si cachées qu'on ne découvre.

[These long chains of reasons, all simple and easy, that the geometers normally use to arrive at their most difficult demonstrations had led me to imagine that all things that could be grasped by human knowledge are interconnected in the same way. And I imagined that, as long as we refrain from accepting any one of them as true that is not true and are always careful to respect the order necessary for deducing each from the others in turn, there can be none that is so removed that we cannot eventually reach it, nor any that is so hidden that it cannot be uncovered.] (*Discours,* AT 6:19)

Descartes insists on the need to assemble his data through a rigorous procedure of testing to avoid error. He advocates a process of systematic doubt that ensures the validity of his chain of associations. A hypothesis becomes true, a link in the chain of deductions, if it can withstand the test of doubt, that is, if one cannot refute the idea that it is the cause of a particular effect.[31]

Once Descartes completes his analysis, he must present his results clearly and convincingly, that is, in such a way as to convince his readers and potential detractors of the validity of his opinions. The two processes are not identical, for the organization of data in the first instance relies on a series of deductions following a mathematical logic, while the record of his results expresses the former relations logically but also rhetorically. The logic of partitioning information into categories remains a highly problematic model for establishing the truth, for its effectiveness depends on an ascertainable and therefore finite number of single identities that remain constant. Yet "truth," "finite," and "fixed" are all terms to which Descartes's *Discours,* indeed all discourse, all representation, gives the lie. In constructing the final record of his analysis, the scientist has the added burden of coordinating any particular set of results from a single experiment with all the data already classified. The representation of his findings that he constructs ultimately must serve as a compendium of all knowledge. In terms of the analysis itself, this idea refers to the need for the scientist to coordinate separate investigations just as he coordinates the individual parts of a particular investigation. When he records this process, narrative elements also come into play. Once integrated into his account of his discoveries, Descartes's references to architecture, his exposition of the method, his opinions about cultural differences, and his statements about the planets, light, the stars,

and so on all have equal value as "things classified." While the history of science, assuming a rational progression of ideas, considers primarily Descartes's method and his physics, specific "knowns" that move research forward, the cultural history that I develop crosses disciplinary lines in an effort to tease out a logic from the representations themselves. Here we see far less than the "clear and distinct" articulations that Descartes theorizes. Classification falls into the same category as composition, melding science with art.

• • •

My interest in Descartes and Vermeer is an outgrowth of my work in *The Classical Model,* in which I showed how literature served as a laboratory of sorts for exploring the model of representation that science developed in France during the seventeenth century.[32] The expansion of my interests to science and art, and to Dutch art in particular, is not, as the foregoing discussion serves to demonstrate, as arbitrary as it might first appear. In *The Classical Model* I developed the concept of a frame structure to explain how literature provides knowledge of experience by validating certain kinds of logical relations, certain models, at the expense of others. Throughout that work, however, I call attention to textual elements that speak to us despite the fact, or even because, they occupy no position within the paradigms that support the frame structure. The present book extends my analysis of the formation of knowledge in the classical period to include visual culture and its influence on the philosophy of science. I intend this work as a modest contribution that opens Foucault's notion of the classical episteme to a wider range of cultural expression.[33] My analysis evolves from his idea of the centrality of taxonomy in defining the classical episteme:

> L'épistémè classique peut se définir, en sa disposition la plus générale, par le système articulé d'une *mathesis,* d'une *taxinomia* et d'une *analyse génétique.* Les sciences portent toujours avec elles le projet même lointain d'une mise en ordre exhaustive: elles pointent toujours aussi vers la découverte des éléments simples et de leur composition progressive; et en leur milieu, elles sont tableau, étalement des connaissances dans un système contemporain de lui-même. Le centre du savoir, au XVIIe et au XVIIIe siècle, c'est le tableau.
>
> [The classical episteme, understood in terms of its most fundamental organization, can be defined as the system articulated through a *mathesis,* a *taxi-*

*nomia,* and a *genetic analysis*. The sciences always intend (however distant the realization of this project may be) to create an exhaustive order of things. They also always attend to the discovery of simple elements and their progressive combinations. And at their core they constitute a table, the display of knowledge within a system contemporary with itself. The center of knowledge in the seventeenth and eighteenth centuries is the table.][34]

I am following Foucault's lead in making the assertion of a common link between representation and classification, and in my emphasis on logic and structures that create knowledge rather than on specific knowns or content. Unlike Foucault, I look to an array of cultural representations to determine what those structures are. Specifically, I consider the mediating role of art as the necessary outgrowth of the failure of science, and in particular that which governs taxonomy, to stabilize knowledge. Foucault's analysis covers the seventeenth through the eighteenth centuries. I present a retrospective look at Descartes as he already models through the method the problems of ordering information that came to haunt eighteenth-century thinkers.

By the end of the early modern period, Newtonian physics held sway over Descartes's formulations. Newton's belief that one works back from the observation to the principle, that is, through a process of induction, largely supplanted Descartes's reliance on deduction. Unlike Descartes (but like Bacon), Newton believed that certainty derives from principles drawn directly from experiments and observation. It would be an overstatement, however, to claim that Newton rejected deduction entirely. Similarly, it would be false to assert that Descartes placed no credence in observations, for he too studied observable phenomena. Likewise, it would be inaccurate to claim that induction had no place in his formulations, since a series of very short deductions, which can be held in the mind all at once and do not require extensive memory, function as intuitions.[35] Moreover, as the history of science moves forward from Descartes to Newton, other factors, I suggest, draw us back to Descartes. The codification of knowledge cuts through the Descartes-Newton debate to forge an essential link between Descartes, who envisages an encyclopedic knowledge, and the Encyclopedists, who set out to document it. Over nearly two centuries, from Descartes to the *Encyclopédie,* much knowledge accrued. A significant part of this body of information referred to advances in physics and medicine. Much, however, concerned the organization of knowledge itself. The Encyclopedists sought to bring together

all human knowledge in a single collection of texts and illustrations. Their *Encyclopédie* serves as a model not only of ambitious thinking about how knowledge could release man from servitude but also of the unwieldiness of taxonomy writ large—large enough to accommodate science's ever-growing production of data.

Although Descartes's model fails to yield the truth, fails as an ideal, it succeeds nonetheless in producing a body of knowledge and a model for ordering it. The Encyclopedists would learn firsthand the difficulties involved in extending Descartes's logical chain of reasoning from idea to text and image. Coordinating texts by 178 collaborators, d'Alembert and Diderot tested and evaluated a model taxonomy of significant proportions, with results that they judged to be limited. Given the vastness of their enterprise, one cannot assume, following Descartes, that one author could have done alone what so many failed to accomplish. The problems the Encylopedists encountered were no more inherent in their numbers than in their individual abilities, the subjects they analyzed, their place within the history of ideas, or the encyclopedic form. The Encyclopedists came up against the limits of classification itself.[36]

The concerns and frustrations that d'Alembert and Diderot express reflect the unacknowledged complications of Descartes's theories which I address. In the "Discours préliminaire" d'Alembert specifies the organization of the *Encyclopédie* by explaining each of the principal branches of knowledge: "Le premier pas que nous ayons à faire dans cette recherche, est d'examiner, qu'on nous permette ce terme, la généalogie et la filiation de nos connaissances, les causes qui ont dû les faire naître et les caractères qui les distinguent" [The first step that we must take in this investigation is to examine, if we may use the term, the genealogy and the interconnections of our knowledge, the causes that gave rise to it, and its distinguishing features].[37] Despite their painstaking organization, including an extensive system of cross-references, and their concerted efforts to be comprehensive and perfectly intelligible, the authors of the *Encyclopédie* admit that much remains obscure. Their decision to classify articles as determined through their relation to either science or art offers a case in point. The intent is clear: "La spéculation et la pratique constituent la principale différence qui distingue les Sciences d'avec les Arts; et c'est à peu près en suivant cette notion qu'on a donné l'un ou l'autre nom à chacune de nos connaissances" [Speculation and practice constitute the principal difference that distinguishes the sciences from the arts; and it is more or less in following this idea that we have assigned

one name or another to our knowledge].[38] The practice, however, is far more muddled:

> Il faut cependant avoüer que nos idées ne sont pas encore bien fixées sur ce sujet. On ne sait souvent quel nom donner à la plûpart des connoissances où la spéculation se réunit à la pratique; et l'on dispute, par exemple, tous les jours dans les écoles, si la logique est un art ou une science: le problème seroit bien-tôt résolu, en répondant qu'elle est à la fois l'une et l'autre.
>
> [One must admit, however, that our ideas on this subject are not determined once and for all. We often do not know what name to give to the majority of information in which speculation is connected to practice; for example, it is still disputed every day in the schools whether logic is an art or a science: the problem could be easily solved in responding that it is both one and the other.][39]

The overlap of science and art, theory and practice, constitutes but one case of many in which differences prove arbitrary or ambiguous. The Encyclopedists experience the frustration of knowing that the specification of the individual elements of things does not in and of itself provide a coherent knowledge; the whole is more than the sum of its parts. They struggle under the self-imposed pressure to order, measure, and unify in one system—the very goals that Cartesianism championed. Many things remain unsaid, uncertain, unknowable.

In the article describing the machine for making stockings, Diderot recognizes the failure of the text and the accompanying illustrations (plates) to represent accurately the mechanics of the operations involved:

> On conçoit, après ce que je viens de dire de la liaison et de la forme des parties du métier à bas, qu'on se promettrait en vain quelque connaissance de la machine entière, sans entrer dans le détail et la description de ces parties; mais elles sont en si grand nombre, qu'il semble que cet ouvrage doive excéder les bornes que nous nous sommes prescrites, et dans l'étendue discours, et dans la quantité des Planches. D'ailleurs, par où entamer ce discours? comment faire exécuter ces Planches? La liaison des parties demanderait qu'on dît et qu'on montrât tout à la fois; ce qui n'est possible, ni dans le discours, où les choses se suivent nécessairement, ni dans les Planches, où les parties se couvrent les unes les autres.
>
> [One understands, after what I have just said about the connection and the shape of the parts of the machine for making stockings, that it would be fruitless to promise that one could provide knowledge of the whole ma-

chine without going into detail in an extended description of these parts. But they are so numerous that this project would appear to exceed the limits that we have set for ourselves, in both the space allotted for the written text and the number of plates allowed. Moreover, where would we begin this account? How would we have the plates made? The connections between the various parts would require one to describe and display everything together, which is not possible, either in the text, where things must necessarily follow one after the other, or in the plates, where the parts cover one another.][40]

The problems that Diderot indicates have much to do with the need to dilate time, on the one hand, and to partition space artificially, on the other. To describe how the machine works, one must narrate individual functions in sequence—this piece connects to that and then does this—although they may occur simultaneously. Similarly, the machine's parts must be deconstructed for individual viewing but then selected and displayed, and thus compressed in accordance with the dimensions of the plates. Neither the text nor the visual illustration of the components of the machine, therefore, renders the effectiveness of the actual workings of the machine, which operates in real time and real space as a fluid whole, with all of its parts interconnected.

What Diderot describes here as a process of elaboration that fails to identify the object properly in all of its functionality echoes d'Alembert's complaint that science and art in the *Encyclopédie,* as in school curricula, are both different and similar. The root of the frustration is the same: the inability of the encyclopedia to represent experience adequately, and thus the failure of the philosophers to separate human knowledge efficiently according to the three faculties of reason, memory, and imagination, and to build a clear body of knowledge despite the seventeen volumes and some fifteen thousand pages they devoted to the task. Invited to navigate the articles through a system of cross-references, the contemporary reader was positioned to accumulate a full knowledge of the topic. Through seemingly benign omissions one could avoid censorship problems related to certain subjects. And one could compensate for such omissions by reading multiple articles. Crossing back and forth through the volumes in this way, the reader composed a fuller table of information, constructing, as it were, a text of fragments that reflected, in addition to a will to knowledge and a certain freedom of expression, an assemblage of information. This information, however, remained particular (keyed to the individual reader) and still partial, since, given all the

possible permutations of texts, one could never flesh out a full and definitive table of knowledge from it. Despite the philosophers' concerted efforts to present an objective documentation, therefore, the final text falls short of their ideals.[41]

Such difficulties are in fact endemic to classification. We recognize this result not because science moves away from analogies toward differences, as Foucault suggests, but rather, as Vermeer helps us to see, because all classification builds from differences to new analogies. No two categories are identical; each specifies a different identity. Each category, however, unites within it a set of similar things. Knowledge depends on such associations. In my analyses of Descartes's text and Vermeer's paintings, I look closely at relations of analogy occurring through explicit comparisons ("the earth resembles the moon"; "the painting offers a likeness of domestic activity") and also through the convention, very popular with seventeenth-century artists but by no means with them alone, of including paintings within paintings. Like many of his contemporaries, Vermeer often included framed portraits and landscapes, maps, and mirror images within his works as decorative elements. His *Art of Painting* (c. 1666–67, Kuntshistorisches Museum, Vienna) (plate 4), a study of a painter's studio, is a touchstone of my analysis, a model to which I return at regular intervals to refine my concept of the science of art. In Vermeer's exquisite renderings, in his attention to the details of inserted works that are not his primary subjects, he speaks volumes to us about composition, classification, and artistry. I deliberately mix metaphors here, claiming that the painter speaks as well as shows, in order to facilitate an exchange between science and art, the discursive and the visual, so as to suggest further that, within representation, identities are not neutral facts, not parts that ensure the accuracy of the whole. Representation is highly tendentious, for in appearing to give us the real, it in fact promotes an artificial view of experience.

Descartes informs our appreciation of Vermeer's intellectual imagination, his ability to transform visual stimuli, observations of the world, into ideas, observations *about* the world. But the devil, Vermeer shows, is in the details. With his eye trained to render the details of the interiors he creates—the flicker of light caught in a mirror, a fabric, an earring—Vermeer replicates the Cartesian project by suggesting that identities are not identities until they are framed by the mind, that objects have no meaning until they are inscribed in representation. But whereas Descartes seeks to penetrate the truth through such representations, Ver-

meer offers evidence that all classification is art. Knowledge builds not only through balanced units, the classically symmetrical forms that we associate with rationalism, but also through a series of asymmetrical formations. Thus, with reference once again to Koolhaas's folded plane structure with its irregular angles, I invite my reader to consider science and art as two broad planes in my reconstruction of cultural production in seventeenth-century Europe. Within these contiguous planes I set the tables of Descartes and Vermeer, respectively. Other planes represent the other arts, ethics, and commerce: practices that make up the full range of cultural activity in this period to which I refer tangentially. I concentrate on the shared line between science and art, not to hear Descartes champion again the cause of reason or to note once more Vermeer's visual sophistication, but rather to facilitate, after the fact, their communication with each other. The fact, of course, is virtual, an epistemology that is a reconstructed history. But this virtual reality is, after all, the state of the art of Descartes's science as it emerges in the reflection of the science of Vermeer's art.

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All translations from the French are my own.

# TABLES OF KNOWLEDGE

# INTRODUCTION

## Three Versions of the Philosopher's Tale

Imagine Descartes seated at his writing table in his room in Leiden, drafting the *Discours de la méthode*. His back turned to absorb the heat of the stove, he holds paper and pen in hand as he looks up momentarily from his writing table, taking in the view outside his window. Working under the light traversing the window, he ruminates about what he has studied in books and what he has observed for himself. He meticulously sets in place his thoughts so as to render them clear and persuasive, yet takes pains to avoid inciting the unforgiving censor's suspicions.[1] The light extends a path across the patterns of the stone floor to the far wall, where a painting captures our attention. It depicts a room similar to that in which Descartes works: black and white marble tiles line the floor; the window mullions divide the glass into small panes; a framed image decorates the wall. A scientist in a long, dark robe standing before a wooden table engages in calculations with the aid of instruments.

From our vantage point this scene of Descartes writing evokes Vermeer's intricately detailed renderings of Dutch interiors, including several of figures similarly hushed in contemplation. No such painting of Descartes exists, of course, although his description in the second part of the *Discours* of how he spent the winter of 1619 working in his *poêle,* a room heated by an enclosed stove, is legendary: "Je demeurais tout le jour enfermé seul dans un poêle, où j'avais tout loisir de m'entretenir de mes pensées" [I would remain locked alone all day in a stove-heated room, where I had the leisure to consider my own thoughts] (*Discours,* AT 6:11). Vermeer's *Astronomer* (1668, Musée du Louvre, Paris) (plate 5) and *Geographer* (c. 1668–69, Städelsches Kunstinstitut, Frankfurt am Main) (plate 6) pay a visual tribute to science in ways that echo Descartes's narrative.

Observed as he writes, Descartes looms larger than the pages spread out before him. As we watch him compose the *Discours de la méthode* for public consumption, aware of our position outside the room just as we are aware of his presence both outside (as author) and inside (as subject) the text that he transcribes, the layers of representation fall into place as so many mirrored scenes of the experience of seeing and knowing. We observe him recounting the moment in which he first conceived "Cogito ergo sum" [I think therefore I am], the utterance that became the cornerstone of his philosophy. Insisting on the centrality of the Cogito within Descartes's *Discours,* Victor Stoichita explains, "*Fable, tableau, histoire,* le 'discours de la méthode' est une 'représentation,' au cœur de laquelle se trouve la proposition fondamentale qui la reflète en miniature: *cogito ergo sum*" [Fable, tableau, history, the "discourse on the method" is a "representation" at the core of which lies the fundamental proposition that reflects it in miniature: *cogito ergo sum*].[2] Stoichita invokes the relation of the *mise en abyme,* which Lucien Dällenbach has defined as "tout enclave entretenant une relation de similitude avec l'œuvre qui la contient" [any part embedded in a work that exists in a relation of similarity with the larger work that contains it].[3] In Descartes's *Discours,* however, the autobiographical narrative does not simply reflect the Cogito (the embedded text). The Cogito reinforces but, by virtue of its universality, fails to mirror exactly the frame narrative that Descartes constructs, his personal account of his theorizing.

To appreciate this distinction one must consider the various elements that make up the *Discours.* The text through which Descartes presents his scientific method also serves as a compendium of his research on metaphysics, physics, medicine, and ethics, as well as, not insignificantly, his autobiographical account of the trajectory of his thinking. Descartes fashions a narrative in which he plays the starring role, or roles. He is both the subject who writes and the exemplar, indeed the agent, of the universal, transcendental subject whose existence he has proved by uttering "Cogito ergo sum." We observe Descartes first recall the moment of his illumination and then reconceive it for posterity: "I think 'Cogito ergo sum.' I write 'Cogito ergo sum' so that you, reader, can see me think, can know my thought, can know that this thought through which I represent myself to myself—not my body or my senses, but rather this representation of me—proves that I exist." Having visualized himself in his mind's eye, Descartes understands that his identity is produced through

thought rather than corporally. Reading the *Discours,* we too see that meaning resides not in things themselves, placed there by God, but rather in human reason, which identifies and orders these things. Descartes's recording of this discovery, his written record—that is, representation to the second degree—also assumes a critical role in the history of science. He offers the scientific method for the reader's instruction. His guidelines for formulating a hypothesis and confirming or falsifying it through experiments constitute a primary element in the table of knowledge that we construct for the classical period. Descartes never lets the reader forget, however, that a real subject narrates the discovery of this method, that he is author.[4] As narrator of his story, Descartes does more than write a fable, as he calls it, an account of his method. In more ways than the philosopher in him wants to acknowledge, the author in him reminds us that his theorizing about the method —the information that he has uncovered about the basic rules necessary to ensure the integrity of scientific research—forms part of a *fabula,* an elaborate story of his discovery of the method. The fable remains as integral to the history of science as the discovery itself. The *Discours de la méthode* promotes science as method but is itself a document that testifies to the imbrication of science and art, indeed, to science *as* art, the art of classification.

By virtue of their explicit subject matter, *The Astronomer* and *The Geographer* likewise remind us that science and art, while separate disciplines with distinct goals, participate jointly in early modern culture as it claims the world for itself through a reliance on the mind and the ability to think, to form judgments, and, not insignificantly, to imagine.[5] Possibly conceived as pendants, each with a scholar at work in a similar studio with a window to the far left and an armoire and a framed image or chart on the back wall, the paintings bear witness to the efforts of science to catalog the workings of the heavens and the earth.[6] The astronomer and the geographer are both positioned before a window, reminding us that science and art similarly privilege the study of light.[7] Scientists investigate the properties of light in conjunction with the effects of the sun, the stars, and the motion of the planets on the earth, and as aids to navigation. Artists dedicate themselves to capturing the play of light on the objects they paint to create a more pleasing and natural appearance. In *The Astronomer* and *The Geographer,* Vermeer invokes the power of light as a force that brings the external world into the studio. He draws attention

to the process through which the natural world enters a scientist's field of vision and then penetrates his understanding. The mind reconceives the light as thought, illumination of another sort.

Science and art share a common focus on the techniques of observation. In each of Vermeer's portraits, the scientist appears to concentrate on tabulations rather than on the observation of phenomena. Books are visible on the table and on the armoire at the rear of the room; we see globes and charts and tools for measuring.[8] Assessing the data they have collected, the scientists prepare to record their findings. Depicted in a moment of contemplation, Vermeer's astronomer and geographer, moreover, convey the artist's own thought process as he establishes the proper perspective for viewing the objects in his painting. Vermeer has chosen to position his subjects so that they seem to absorb the light, both metaphysical and physical, that emanates from a source outside the room in which they work. Vermeer carefully frames his image to reflect the scientist's active cogitation. Ultimately, not the natural light alone but this light as manipulated by Vermeer for a specific effect informs our knowledge of the scene. At first glance, the window seems merely to be an object that we view, albeit a privileged one through which light enters to make other objects available to us. Vermeer, however, suggests a mental calculus. Mediating exterior and interior, nature and the mind, the window frames, literally and metaphorically, the process through which the things of the world become signs that the rational subject conceives, analyzes, and, eventually, masters. The window structures knowledge: the scientist's, the artist's, and our own.

Descartes similarly takes his inspiration from the window frame. In the second Meditation he describes the experience of looking out the window at people outside: "If by chance I were to look out a window and see some men walking down the street, this sight would cause me to say that I see men . . . ; yet what do I see from this window if not hats and coats that could cover ghosts or artificial men (automatons) whose movements are controlled through springs? But I judge them to be real men, and thus what I believed I saw with my eyes I in fact understand solely through the faculty of judgment located in my mind" (*Meditations*, AT 7:32).[9] Descartes mistrusts the senses. He argues that we cannot know through vision alone. Our eyes see. In order for us to know what they record, however, the mind must convert into thoughts the sensory stimuli that they relay to the brain. Measuring, ordering, dividing, and reassembling the information it receives, the mind fixes identities much as

the astronomer and the geographer chart the heavens and the earth. In Vermeer's paintings the mullions on the window frame the light entering the room. The mind similarly frames ideas through judgments, which alone certify knowledge. This process is critical, for it liberates us from the notion that the meaning of things resides inside them. Yet it is not enough to see things or to know that we think about what we observe, or even that we know the things of the world as mental pictures, representations. We must become aware of our particular window onto the world.

Although he sets in place the mechanisms for making reasonable judgments, Descartes in many ways fails to appreciate fully his place within his discourse and, consequently, within his science. Vermeer allows us to see that the window, like other framed images, proves critical to our understanding not only because it mediates what we know but also because it establishes itself as the artificial limit of what the mind can process. Vermeer frames a painting of two subjects, two scientists, who, like him, frame a vision of the world within a measurable space. Descartes articulates clearly how the window/mind frames knowledge. Yet instead of a clearly circumscribed subject, we encounter the multiple "I"'s of Descartes's text: the author of the *Discours*; the protagonist of his narrative about his discovery of the method; the subject who performs the Cogito; the universal subject identified by the Cogito.[10] Although these subjects can all be telescoped into one "I," that of the author who sets them in his narrative, Descartes fails to account fully for his role in shaping not only the fable that is his narrative about his discovery of the method but also the final record that his applications of the method produce. As Descartes moves from theorizing the method to applying it, he intends to drop the fable. He cannot, however, drop the frame structure of representation itself, which he has authored. That is, while he envisions truth as the ultimate end point of his investigation, Descartes does not concern himself with the fact that he attains the truth via a self-contained system, meaning one that coheres, but also one that that he has developed, that originates with him. The quest for truth yields a stunning yet restrictive knowledge whose precise outline remains in the shadows of Descartes's text because he does not fully account for his position as author.

Sitting inside his room in Leiden, Descartes analyzes the world outside just as he had done previously in his heated room in Germany, where he first had his inspiration. So, too, we have seen, Vermeer's scientists endeavor to bring the outside inside, into the *camera,* or room, in which

they work, as into the *camera* of their minds.[11] The Latin *camera* evokes these spaces and also the camera obscura (fig. 1), a perspective device that forms part of the optical arsenal that captivated both scientists and artists in the seventeenth century. Yet the absence of telescopes or other lenses in Vermeer's paintings is striking. Vermeer communicates through this omission that the scientists' work involves less the observation of phenomena, whether the planets and the stars in the heavens or the continents and the oceans on earth, than their ruminations about what they observe. Symbolized in the celestial and terrestrial globes, the sea charts and compasses, these paintings represent the mind engaged in the act of thinking, as it translates observations into facts. These units of knowledge, however, make sense only within the whole of the system that the mind constructs to explain it. Each object in Vermeer's painting, each detail of his depiction of the scientist's studio, signifies in relation to the other details. A globe that in another context might only be a sign of travel here signifies the particular exploration that science undertakes. Similarly, the frame of the window reinforces the framed images on the wall. The latter signal to us that the whole work is a formal portrait which Vermeer has fashioned strategically by reinforcing the notion of the frame, the image as formed in his mind and projected onto the canvas. The viewer knows that the apparent realism of the scene is actually a cultivated effect, a portrait designed to conform with certain expectations of good art, as of good science.

The inserted painting on the back wall of *The Astronomer* is *The Finding of Moses*. In *The Geographer* a sea chart occupies this position. Does the biblical theme in the first painting serve to reinforce Descartes's notion that the earth and the heavens are composed of identical matter? We have no reason to believe that Vermeer knew of this theory, but it appears likely that by inserting *The Finding of Moses* in his portrait of the astronomer, the painter meant to link the secular ambitions of his subject with the biblical theme of Creation. We cannot know for sure whether the painter intended in this way to "bless" the astronomer with divine guidance or to suggest that the scientist's calculations allow him to discover the divine order of Creation.[12] Vermeer's use of a map rather than a painting on the rear wall in *The Geographer* certainly does not clarify these relations. Unmistakably, however, the iconography of the inserted images suggests categories of identities. The Moses painting offers a link with the heavens that reinforces the professional identity of the astronomer who examines the universe. The sea chart reinforces the pro-

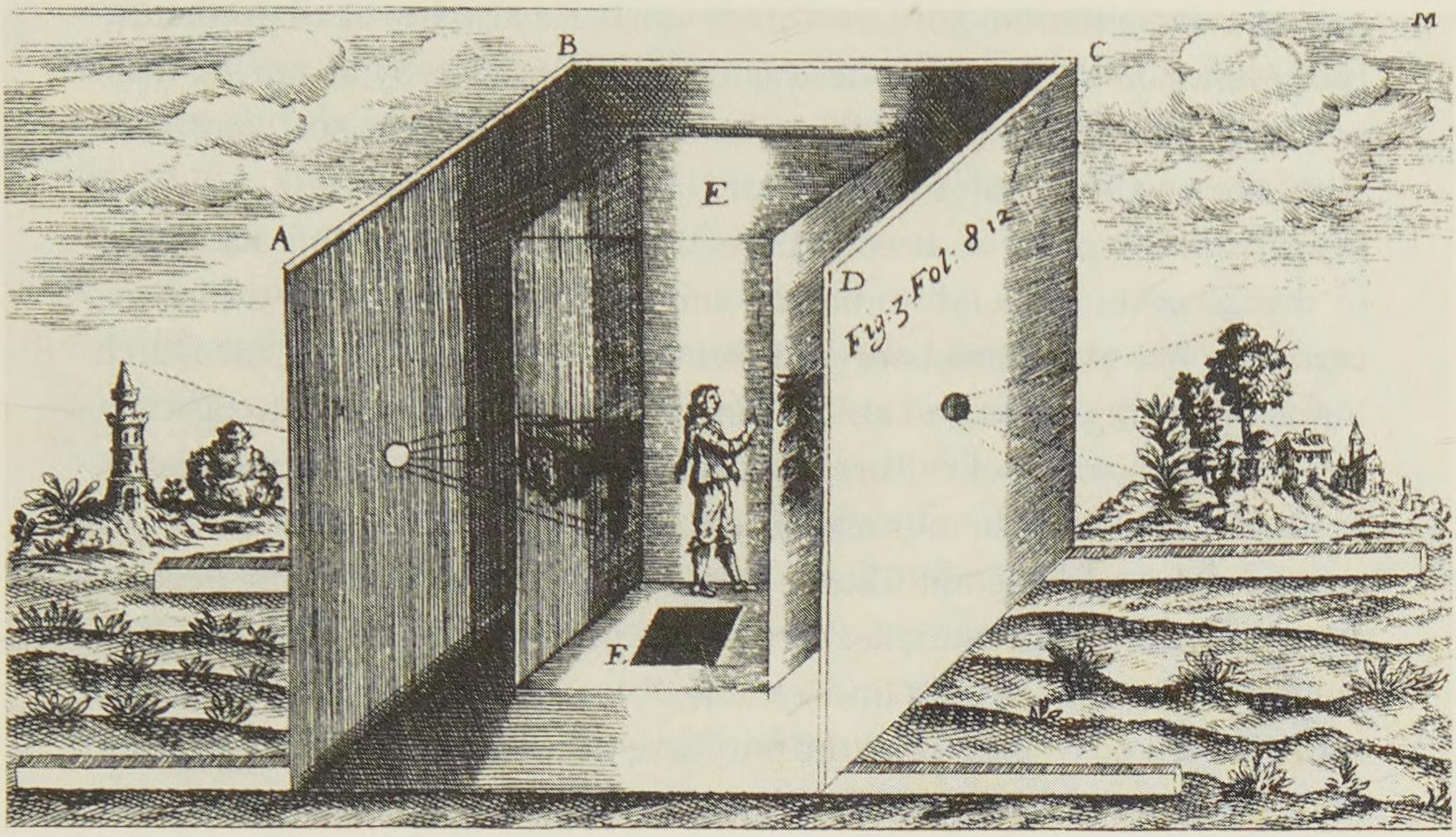


FIGURE 1. Camera Obscura. Athanasius Kircher, *Ars magna lucis et umbrae* (Rome: Sumptibus Hermanni Scheus, 1646). Washington University Libraries, Department of Special Collections, St. Louis.

fessional attributes of the geographer who examines the earth.[13] More than a reality effect, therefore, the framed paintings within the painting suggest the act of conceiving and fleshing out paradigms that is also key to Descartes's work.

To elaborate the physics of the universe, to map the topography of the earth, and to decorate homes with maps and with portraits of scientists engaged in mapping is to share a common inspiration. Each activity represents a commitment to document the things of the world. The capacity to identify the various elements of life ensures a certain control; it facilitates the ability of science to predict and regulate elements within nature. By offering a wealthy burgher a beautiful image of the things in his world, Vermeer responds to a similar urge to assert control over the elements, albeit within the socioeconomic sphere. Attempting to improve the material conditions of life by identifying the properties of the physical world through refined microscopes and telescopes, the scientist resembles the Dutch artist who uses geometry, lenses, and perspective devices to improve the appearance of the objects on the canvas. Concentrating the elements he discovers into recognizable patterns, the scientist

gains an understanding of how things work. He also learns to predict future events on the basis of these same patterns, thereby acquiring mastery over nature. In their inventories of domestic life, artists, concerned with the aesthetic value of ordinary activities, demonstrate a similar propensity for order as it reflects rectitude, cleanliness, and also pride in things as they are. More bawdy and raucous scenes offer titillation, certainly, but also models of conduct to be avoided. Indeed, in Dutch homes, paintings of sacred and profane subjects often appeared together, suggesting a leveling of culture, a secularization of art valued for its range as much as for its righteousness. The mingling of themes was not simply an effect of the Protestant Church's turning away from elaborate decoration. Outside Dutch churches, art that expressed a more vibrant social palette could more readily find a home, literally that of a burgher whose status would be enhanced by the purchase of such works. Through commerce and an accumulation of goods, including art, the prosperous burgher became the imposing master of all of life's bounty, at least within the walls of his well-appointed rooms.[14]

The moral content of a painting therefore inevitably takes a back seat to the artist's celebration of objects themselves, the accouterments of the drama that is middle-class life. Depicting images based in their immediate world, a world of familiar things released from an explicitly religious context, genre painting evokes the same urge to classify that grounds Descartes's study of nature.[15] Paraphrasing Descartes, Stoichita notes that Dutch artists "travaillent à des ouvrages de précision, et . . . . ont l'habitude de diriger attentivement leur regard sur chaque point, en acquérant à l'usage le pouvoir de discerner parfaitement les choses les plus petites et les plus fines" [execute precision works, and . . . are accustomed to directing their attention to each dot; through practice they acquire the power to distinguish perfectly the smallest and most delicate things].[16] By cataloging the objects of the home in their works, artists transform them into signs of plenty, evidence of an increased purchasing power and also of an increasingly material culture. The affluence of the middle class was notable, as was the fact that trade brought them into contact with goods from overseas. Simon Schama categorizes the extraordinary success of the middle class in biblical terms: "Capital begot capital with astonishing ease, and so far from denying themselves its fruits, capitalists reveled in the material comforts it bought. At midcentury there seemed no limit, certainly no geographical limit, to the range of its fleets and the resourcefulness of its entrepreneurs. No sooner was one consumer de-

mand glutted or exhausted than another promising raw material was discovered, the supply monopolized, demand stimulated, markets exploited at home and abroad."[17] Those enriched by trade built expensive homes in which art reaffirmed the owners' status by privileging their possessions, including an array of exotic items from overseas, many of which found their way into the genre paintings and still lifes that the artists created.

Although they elaborate what I term a detailed taxonomy of the things of their world, Dutch artists do not represent this world objectively. Not only do they capture class divisions as these involve a set of privileges, predilections, and prejudices, but also they flatter the viewer by taking the ordinary and making it art. Incorporated into a painting, a pot does more than boil water or allow meat to cook. Reflecting the light shining through the window, the pot abandons part of its utilitarian function to assume a role for posterity as a thing of beauty. As a painted object, the pot releases the owners of the painting—owners of pots and pans and kitchens whose deliveries need monitoring—from some of their daily concerns and offers them an emblem of success.

Nor does Descartes, for all of his attention to precision and details, offer us an unmediated knowledge. Epistemology is a study of systems, and Descartes advocates the power of systems. But his human presence, his foibles as a man and also as an author, precludes our facile understanding of his rationalism as an efficient and infallible method for establishing the truth. In the *Discours de la méthode* Descartes does not simply identify what he sees as so many irrefutable facts. The rational subject thinks analytically, relentlessly rejecting the false and the probable and adopting only the true in a string of reasons, or intuitions, that form a system of ideas.[18] Yet certain assumptions and value judgments inevitably influence the system Descartes develops for representing his data to the public. Like Vermeer's astronomer, Descartes studies the moon and the rotation of the planets. Like the geographer, he travels to observe and analyze physical, biological, and human properties, studying not only natural wonders but also people in diverse societies bound by different laws and customs. Descartes, however, cautions against too much travel; he warns against a protracted foray into the book of the world. He rejects the spectator's role, the observation of different cultures, just as he rejects the great books he has read. Were he merely to accept them without a challenge, the theories promoted in these books would turn him into a passive observer of science. They would preclude the very engagement, the critical thinking, that sets him, and with him all of science, on a new

path. Nonetheless, with the *Discours,* Descartes presents another book, another narrative, of the world. He advocates a method to ensure the objectivity and mathematical accuracy of the knowledge he assembles. Much in his narrative, however, gives the lie to this procedure and invites further scrutiny. Two examples set out the problematic in terms of his aesthetics.

Descartes draws an analogy with an architectural renovation to affirm that "too many hands" spoil the design. Ideas, like buildings, are best organized by one man: "Souvent il n'y a pas tant de perfection dans les ouvrages composés de plusieurs pièces, et faits de la main de divers maîtres, qu'en ceux auxquels un seul a travaillé" [Often works composed of several pieces and made from the hands of different masters are less perfect than those which one person alone has made] (*Discours,* AT 6:11). Buildings that a single architect begins and completes are, he maintains, normally more beautiful and better structured than those that several people tried to restore by using old walls built for other purposes. Descartes admits through the qualifier "souvent" [often] that what he affirms is not always true. It may well be that an architectural project designed and completed by one man succeeds where others involving more men fail, just as it may be true that a structure originally intended for one purpose cannot be adapted to another purpose by someone else. But it may also be true that such buildings can be remodeled successfully, and that a team of architects working together or different architects working over the course of decades or even centuries produce a design as good as or arguably better than that of the original architect. The success of the remodeling may depend on the original state of the building; some architectural forms more readily adapt to expansion and change than others. Thus several architects, all of whom follow a unique style, may encounter different challenges owing to variances in the original structure. Alternately, one might judge a building more attractive and better organized because its parts, although they work together harmoniously, remain distinct, revealing the hand of the individual architects who designed them. I. M. Pei's pyramid design for the Louvre offers a modern-day example of different styles that, for some, marry well, but for others clash. Taste, as both a recognized aesthetic standard and a personal predilection, also enters the mix.

Descartes narrows the field of possibilities, of course, to promote his own position. He seeks to be the undisputed authority of the science he champions, and to champion this science by reinforcing the classical

ideals of order, harmony, and integrity. The notion of a uniform architectural design effectively models his basic theoretical assumption that a unique knowledge undergirds all of science. The logic appears solid because the law of analogy assures a certain coherence: one foundation (the architectural) lends support to the other (the method). Yet Descartes's "I," rather than any transcendental truth, grounds his analogy. Noting other variables that he excludes from his discussion which cause us to recontextualize what he writes, we see that his argument, though consistent, is not the only one that we could apply to the circumstances—not the only argument, that is, unless he, Descartes, and not a universal I, stands as the only recognized subject. The self-validating aspect of his proposition thus compromises the truth it purports to offer.

As Descartes moves from individual buildings to an assessment of the city that contains them, his analysis becomes even more categorical. He argues that ancient cities which originally were only villages became, over time, large and aesthetically unappealing places. Marked by irregularities and other architectural inconsistencies, these cities exhibit an eclecticism and a randomness that the philosopher disdains: "Toutefois, à voir comme ils (leurs édifices) sont arrangés, ici un grand, là un petit, et comme ils rendent les rues courbées et inégales, on dirait que c'est plutôt la fortune que la volonté de quelques hommes usant de raison, qui les a ainsi disposés" [Nevertheless, when we see how they (their buildings) are arranged together, with a tall one here and a short one there, and how they make the streets curved and irregular, we would say that it is more chance than the will of certain men who apply their reason that sets them in place like this] (*Discours,* AT 6:11–12). Descartes's insistence on the need for an overarching plan to govern the whole, whether city or science, poses a certain number of problems. Would his system for ordering a table of elements not function like a city plan that favors certain architectural styles over others? As a scientist he cannot afford simply to reject certain data in the way that an architect might reject certain ornaments. Moreover, Descartes's insistence on regularity, harmony, and "unicity" might in the end impose an order on a world that is in fact far more inchoate, just as Vermeer presents the artificial calm of domestic interiors devoid of the raucous behavior present in many Dutch inn scenes of the same period. Information filtered through this system would inevitably distort the philosopher's data, for it rules out the consideration of certain factors in favor of others that he deems more pertinent. Even though Descartes may establish a system that works coherently, the fact that this

order is internal, dependent on the frame or grid that he applies, means that his results are tainted: part art/artifice, part science/truth. The binary opposition *science versus art* therefore no longer holds.

I have been suggesting that Descartes develops a double method: he applies the rules he specifies in order to produce authentic ("true") data and, in a second phase, he applies the same rules to order the data into a representation, a narrative that functions as a table of elements. Even if Descartes were to succeed in applying the rules and obtain a mathematically rigorous set of data, his representation of these data would to some degree be compromised by the categories he establishes. His taxonomy has a built-in bias of sorts, for he cannot avoid incorporating certain values that he as author holds dear. Still others that are encoded in society may infiltrate his table. Indeed, despite Descartes's categorical rejection of customs as a standard for ascertaining the truth, certain values are so embedded in accepted ideas and practices that he runs the risk of mistaking an arbitrary notion for an essential element of knowledge. Once established, categories function as molds, if not as outright censors, within the system that the philosopher develops. That is, he filters new identities through these categories, a process that inevitably distorts the results. We would have to dismantle all of these structures for the truth to emerge, since the categories themselves represent a certain orientation, an epistemological predisposition to see things in certain ways.[19] Such a comprehensive reconstruction remains unlikely, given that we always work within the logic of existing codes, within the intellectual machinery that we define as culture. We cannot think outside the logic—the possibilities for knowledge—through which we identify ourselves and our place in the world. The table of knowledge that we construct on the basis of this logic thus represents the sum of our cultural achievements but also its limits.

All knowledge, Descartes observes, correlates with a particular cultural orientation. In his case, the principal referent is himself: "Ce qui me faisait prendre la liberté de juger par moi de tous les autres, et de penser qu'il n'y avait aucune doctrine dans le monde qui fût telle qu'on m'avait auparavant fait espérer" [This made me take the liberty of judging all others in reference to myself, and of thinking that there existed no knowledge in the world that conformed to what I had previously been encouraged to anticipate] (*Discours,* AT 6:5). If he changes the context, if he recognizes the boundaries of a set of beliefs or theories ("what I had previously been encouraged to anticipate"), Descartes is able to evaluate

these ideas properly. But can he ever step fully outside his own cultural identity, outside his own role in representation to attain the truth?

Descartes believes that with the four rules of the method he offers a protocol for science that will prevent one from ever mistaking what is false for what is true.[20] The correct application of the method involves making the right deductions. To do so one must make the right choices; that is, one must determine the correct order of things in a logical sequence. Sequencing in turn depends on the correct selection of the things to be ordered. The analysis works only if one excludes nothing. In this all-inclusive approach, Descartes distinguishes himself from fabulists and historians who carefully select their material to reinforce the themes of greatness:

> Outre que les fables font imaginer plusieurs événements comme possibles qui ne le sont point; et que même les histoires les plus fidèles, si elles ne changent ni n'augmentent la valeur des choses, pour les rendre plus dignes d'être lues, au moins en omettent-elles presque toujours les plus basses et moins illustres circonstances.
>
> [Furthermore, fables make us imagine many events as possible that are not possible; and even the most faithful histories almost always omit the lowest and least illustrious circumstances, even if they do not change or increase the value of things to make them more worthy of being read.] (Discours, AT 6:6–7)

Descartes condemns the implausibility of these accounts, arguing that readers who attempt to imitate what they find in them are apt to adopt outrageous behavior and to conceive projects that far exceed their abilities. These observations notwithstanding, Descartes does not assure the efficacy of his own argument. Even if he were to analyze carefully all the elements of a problem through a rigorous series of deductions, the possibility exists that he would in fact omit something. He cannot always know all the relevant elements. Were one of these factors to enter the equation at a later date (indeed, such events mark the history of science), the truth he uncovers might prove false. Good science requires that the scientist review the initial hypothesis, making alterations where necessary. We have no reason to assume that Descartes does not understand the need to formulate and reformulate his ideas; he remains devoted to a continual testing of his hypotheses until all doubt disappears. Yet at no point in these examples does Descartes appear to speak of his work, of applications of the method to be completed in a given space and time, as

representing not only the will to know but also the choice (implicit or explicit) to select out certain elements at the expense of others.

One might find it odd, given his rejection of fabulists, that Descartes conceives the *Discours de la méthode* as a fable. Arguably his most "fabulous" moment in the *Discours* concerns his introduction of his new physics by way of a fictional planet:

> Mais, tout de même que les peintres, ne pouvant également bien représenter dans un tableau plat toutes les diverses faces d'un corps solide, en choisissent une des principales qu'ils mettent seule vers le jour, et ombrageant les autres, ne les font paraître qu'en tant qu'on les peut voir en la regardant: ainsi, craignant de ne pouvoir mettre en mon discours tout ce que j'avais en la pensée, j'entrepris seulement d'y exposer bien amplement ce que je concevais de la lumière; puis, à son occasion, d'y ajouter quelque chose du soleil et des étoiles fixes, à cause qu'elle en procède presque toute; des cieux, à cause qu'ils la transmettent; des planètes, des comètes et de la terre, à cause qu'elles la font réfléchir; et en particulier de tous les corps qui sont sur la terre à cause qu'ils sont ou colorés, ou transparents, ou lumineux; et enfin de l'homme, à cause qu'il en est le spectateur.
>
> [But just as painters, unable to represent all sides of a solid body equally well on the flat surface of the painting, choose one of the principal sides to set facing the light and cast all the others in shadow in order to make them seem only as they would when viewed from the angle of the chosen side, so I, fearing that I could not put all of my thoughts into my discourse, decided to expose fully only what I thought of light. Then, as it became necessary, I added something about the sun and the fixed stars, because almost all light comes from them; about the heavens, because they transmit light; about the planets, the comets, and the earth, because they reflect the light; and especially about all the bodies on the earth, because they are either colored or transparent or luminous; and finally about man, because he is the observer of all of these bodies.] (*Discours*, AT 6:41–42)

Descartes here presents what I regard as his aesthetics, the art of his science. Like Vermeer's *Art of Painting* (plate 4), this text functions as a central paradigm within my study; it is an integral component of the table of knowledge that I construct. Focusing on the properties of light, Descartes offers further testimony of important intersections between scientific and artistic endeavors. He supports his study of physics through a detailed analogy with linear perspective. Originating in Florence in the early fifteenth century, linear perspective is a mathematical system for creating the illusion of space and distance on a flat surface. Descartes

theorizes a process of deductive reasoning based on mathematical models, specifically geometry.[21] Like artists who employ geometric principles to achieve a "true," or realistic, rendering of objects in space, Descartes models his analysis on the rules of geometry in order to secure a "true" assessment of things in the world. Geometry stipulates that one uncovers the identity of an unknown by comparing it with a known. Analytic work does not, however, progress as straightforwardly as Descartes indicates. An artist supplements or even subverts linear perspective through the addition of color and shading to control the appearance of an object within the two-dimensional space of the painting. Similarly, although he proceeds with his analysis by following the mathematical model, eliminating one unknown at a time, Descartes relies on narrative, complete with rhetorical flourishes and analogies to art, to make his points. Descartes endorses the tricks of the trade through which a painter represents three-dimensional objects in a two-dimensional space to justify including in his text certain elements of his physics at the expense of others. He thus consciously develops a narrative that operates through a process of selection rather than accumulation. Descartes justifies his selection here on the grounds that he is summarizing another text; he controls both the part that we see and the whole that he did not publish. But there remains much more. He must persuade his reader of the rightness of his ideas while evading the censor's wrath. We might well conclude, therefore, that his record contains a bit of narrative magic along with its respect for the rules: he makes the things of the universe appear "tant qu'on peut les voir" [only as they would when viewed] from one perspective, although these things have other aspects, other angles, that he occults in order to make his point effectively. Even the full version of his results, the aggregate of all of his thinking, represents but a subset of all possible data; the process is infinite.

The question thus becomes: Can he, or we, ever complete an accurate table of elements? I believe that Vermeer helps us to formulate an understanding of this critical issue, which speaks to the foundation of the new science of the classical period. Descartes in his heated room and Vermeer's scholars in their studios establish parallel systems for ordering identities. While at first glance the parallel appears to be simply that of framing knowledge, that of the light entering the mind as it passes through the window, closer examination suggests that the framing device not only ensures the safe transmission of data but also molds a particular perspective. As all perspectives are partial, a limited view of an object or a

problem having more sides, the framing process does not guarantee the truth. Seeing gives way to knowing, but truth remains elusive.

In Vermeer's portraits the scholars' eyes are inscrutable. We barely see those of the astronomer, who gazes at the globe; the geographer looks away from us out the window. Their hands, however, engage us. With his left hand the astronomer holds the table while with his right hand he reaches to turn the globe, searching. The geographer firmly grasps a book in his left hand and, more casually, dividers in his right hand. The imbalance between the left hand which anchors the body and the more open right hand suggests a moment of suspended action, a moment of reflection. The hands move in response to directives from the mind, from a clearly formulated set of ideas that man, not nature, creates. Fittingly, the hands, positioned in each image to reflect the angle of the light as it enters the studio, focus our attention on performance. They reinforce the idea of a motivated act, the will to knowledge. To speak of the burgeoning of knowledge in seventeenth-century Europe is to refer to the shaping, and not merely the uncovering, of identities. Invoking not only the eye that sees but also the hand that writes and paints, I in turn offer as a model of classical representation the table of knowledge that coordinates the rigors of a scientific system with the artifice of art.

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Michel Serres, Christopher Braider, Jonathan Crary, Victor Stoichita, and Brian Jay Wolf have all written perceptively on connections that exist between Descartes and Vermeer. Their work has impressed on me the richness of the comparison between these two eminent figures of the seventeenth century, and I will have occasion to refer to their texts in the course of my analyses. These critics explore Vermeer's paintings through the aid of Descartes's theories as they relate to the primacy of reason, the mind as it mediates what the eye records. I, too, examine the relation between the *res cogitans* and the *res extensa,* mind and matter, observer and world.[22] My own investigation of the connections between Descartes and Vermeer, however, shifts the focus away from this distinction to an assessment of the kinds of thoughts the mind proves capable of producing. That is, I look beyond Descartes's theorization of subjectivity to evidence of the kinds of thinking that he and Dutch artists actually structured. I therefore interrogate a tendency within art history to emphasize the heightened visual qualities of much Golden Age art, and argue, consistently with the scholars who have seen a connection between this art

and Descartes, that we find evidence of rational, analytic compositions. I, too, posit an opposition between seeing and thinking, but I study more closely the strategies that artists, and in particular Vermeer, employed to inventory and interpret their world. Benefiting from the work of cultural historians who define specific social codes and values based on seventeenth-century documents that prescribe and/or illustrate certain practices, I consider how Vermeer's depictions of his world provide models both of the human capacity to order thoughts and of a particular set of thoughts that he has ordered. For Descartes the difference between the *how* of method and the *what* of representation, between the theory of analytical thinking and actual systems of classification, proves critical, and the synchronism between his initial theory, his analysis, and his final record is by no means assured. Throughout this book I remain focused on Descartes's account of his discovery, his discourse as narrative.

In chapter 1 I draw examples from Dutch genre paintings and still lifes to stipulate a relation between a scientific table of elements and the table on which fruit and vases are displayed in a Dutch interior. Not since the nineteenth century have scholars considered Dutch Golden Age art to mirror directly everyday life. In the twentieth century, art historians refined the notion of realism to mean less a slice of life than a world mediated through a series of embedded and often moral touchstones. Eddy de Jongh, following Erwin Panofsky's iconographic interpretations, showed how Dutch painters created images that originated in figures appearing in emblem books and in other images that served as reference points for a set of cultural beliefs.[23] A popular tradition in Holland in the seventeenth century, emblem books offered a motto and an engraving for each emblem, usually with lines of verse that explain the connection between the motto and the image. Mariët Westermann notes, "Emblematic pictures could include difficult allegorical references, understandable only to educated readers, but in the seventeenth century they often included plain objects of scenes from everyday life.[24] Thus scholars held that the emblem books, rather than daily life as an artist would have directly observed it, provided a context for interpreting genre paintings. In the 1980s Svetlana Alpers introduced an alternative concept of realism, one based on links between art and science, specifically optics.[25] She argued that Dutch Golden Age painters re-created the physical experience of seeing, transposing the image onto the canvas in such a way as to retain the quality of what the eye initially registers. Rather than reenter the art-historical debate, which was quite fractious, I build on Alpers's

model to sustain the link between the painterly world and that of science. Yet I extend Alpers's notion of science as technology (lenses that enhance the functioning of the eye) to include epistemology. Examining Vermeer's *View of Delft* (c. 1660–61, Mauritshuis, The Hague) (plate 7) and *Art of Painting* in conjunction with Willem Kalf's *Still Life with a Late Ming Ginger Jar* (1669, Indianapolis Museum of Art) (plate 8), and still lifes by Balthasar van der Ast (*Still Life with Fruits and Flowers,* c. 1620–21, Rijksmuseum, Amsterdam) (plate 9) and Jan Davidsz. de Heem (*Festoon of Fruits and Flowers,* c. 1660–70, Rijksmuseum, Amsterdam) (plate 10), I underscore the link between science's search for knowledge via method and the painters' organization of experience in their compositions. Reductionism, Descartes's model for breaking down a problem or phenomenon into its component parts, has had a lasting effect on scientific investigation. The logic that allows the arrangement of individual parts also allows the scientist to organize them in a discourse, the permanent record of his findings. I work from the supposition that the Dutch painters' focus on the individual object and its relation to other objects in the image evokes the same effort to distill the properties of nature that preoccupies Descartes. Referring to the camera obscura as both a technical device and a model for representation, I further explain how the act of framing an idea, of conceiving it within particular limits, proves equally critical to science and to art in the seventeenth century, but in ways that are not equally validating for each discipline.

In chapter 2 I explore the boundaries of representation by comparing Descartes's use of allegory in his account of his physics and Vermeer's *Art of Painting,* a work that extends the spectral play of another seventeenth-century masterpiece celebrating the art of painting, Velázquez's *Meninas* (plate 3). I read Descartes's allegory and the painters' narratives as similarly conceived outside of history. Interpreting the painters' self-reflexive images in terms of a space that they isolate and frame, I offer their representations as models for evaluating Descartes's invention of a fictional planet and his problematic references to the Genesis account of Creation to validate his theories of the workings of the universe.

Throughout this book the paradigm of framing remains the critical category for understanding how both science and art structure meanings. In chapter 3 I look inside the frame structure at particular categories, or paradigms, that Descartes and Vermeer each establish. The prevalence of inserted paintings (*mises en abyme*) in Vermeer's *Concert* (c. 1665–66, Isabella Stewart Gardner Museum, Boston [stolen 1990]) (plate 11),

*Music Lesson* (*A Lady at the Virginals with a Gentleman*) (c. 1662–64, The Royal Collection, London) (plate 12), and *Art of Painting* offers further grounds for testing an elementary ordering system, that of analogy. Art assigns value to all things that exist in the world by reproducing them on canvas. In the case of a "quoted" or "inserted" painting within the painting, this embedded image confirms mastery of at least the formal properties of the things it represents (size, color, and so on). All objects in the painting are available to us as identities or ideas that signify, but the replication of the image within the work establishes a pattern of meanings, a category of knowledge. This concept has critical implications for science as well. In chapter 3 I explore ways in which Vermeer's interior paintings, through a consistent emphasis on framing the subject, inform our reading of Descartes's representation to show that facts always emerge within a particular context. Knowledge cannot, therefore, be the equivalent of the mere accumulation of identities, however spectacular.

In my conclusion I evaluate Descartes's aesthetic in light of Poussin's *Jugement de Salomon* [Judgment of Solomon] (1649, Musée du Louvre, Paris) (plate 13) and a series of paintings by Vermeer: *Woman Holding a Balance* (c. 1664, National Gallery of Art, Washington, D.C.) (plate 14), *Woman with a Pearl Necklace* (c. 1664, Staatliche Museen, Berlin) (plate 15), and *The Girl with a Pearl Earring* (c. 1665, Mauritshuis, The Hague) (plate 16). Returning at the end to the French tradition, I find evidence of Euclidean geometry harnessed in works of art intended to idealize the monarch. But there is no true exultation, no truth in the logic that grounds the myth, any more than in the fable that supports Descartes's science. The three Vermeer works neutralize myth, both that of the seventeenth-century monarchy, which finds its reflection in heroic deeds of antiquity, and that of Descartes's truth, his fabled science. Vermeer does not simply validate the objectivity sought by Descartes; he does not mirror a neutral, mathematical grasp of the world. Rather, he demonstrates the limits of observation, locating art in the transcendent quality of objects that convey more than their physical features, more than we can observe empirically. Vermeer offers a vision of the world that combines a remarkable clarity with a certain inscrutability. Arguably, his greatest contribution to our understanding of how knowledge is produced remains his demonstration of this fundamental ambiguity, which science in its purely mathematical state must reject. Vermeer's pearl of wisdom is a girl painted with an earring, an image which, though it would appear to bear no resemblance to the Cartesian preoccupation with physics,

speaks eloquently through its captivating reflections about the light that binds science and art.

Cartesian science stakes its claim on rejecting fictions as well as the almost true, indeed even the possibly true. It implicitly rejects an identification with art, for it defines itself in reference to the truth it seeks. Vermeer informs us through direct demonstration, however, that taxonomy is an art. As we come to know the seventeenth century in Europe, we see a period in which the structuring of identities, the classification of individual facts about nature and society, was a creative as well as a rigorously logical endeavor. The result, if less than the truth that Descartes sought, is a most satisfying table of knowledge.

My book is also a representation. The texts and images that recur in different chapters do so, as I have indicated, by design. They function as *mises en abyme* of my own text, revealing how I have assembled a set of meanings into my own table of knowledge about seventeenth-century Europe. I therefore offer not a history of knowledge in the seventeenth century but, in a consciously self-reflexive manner, a representation of how we, from our vantage point, may come to understand the epistemological underpinnings of this period, the will to knowledge experienced culturally, across disciplines as across national and class boundaries. Considering Descartes together with Vermeer has the particular virtue, for scholars formed in the French tradition, of freeing us from the confines of the French monarchy and the knowledge it governed through its exclusive control of intellectual property by means of commissions, privileges, academies, and other forms of patronage. Not only do we leave the French court for the stridently bourgeois homes of Vermeer's Holland, but also we come to understand the process of piecing together knowledge that typifies the intellectual vigor of this period. For scholars steeped in the history of art, the foray into Cartesian science is a look at a new math. Inserted paintings prove the old rule that one plus one does not add up to a simple mirroring of smaller and larger, but rather equals two—or more. Scholars of Vermeer and other painters who incorporate paintings within paintings note consistently that one, two, or more meanings may simultaneously adhere to the work. The new math, however, would have these analyses of art double back with Descartes's original calculations for a more expansive view of culture, in general, and a broader appreciation of the interrelations of science and art in formulating the rules of representation as rules of artistic engagement, in particular.

# 1

# OBJECTS ON DISPLAY

During the Dutch Golden Age, which experienced the prodigious rise of the middle class, the home and its contents became the stuff of art.[1] Much like scientists concerned with uncovering the secrets of nature by enumerating the properties of matter, Dutch painters identified the secrets of the burgher's private space.[2] Focusing on domestic activities within specific areas of the house, in rooms often leading to other rooms concealed behind doorways half glimpsed across an expanse of marble tiles, Vermeer and his contemporaries catalog the intimate space of a class whose wealth, while often discreetly displayed, nevertheless expresses itself through an imposing array of material possessions. The paintings do not, however, archive the period with fidelity. Although artists were drawn to the patterns of marble tile, for example, such tile rarely covered the floors in burghers' homes:

> In those houses of the very wealthy where floors of this type were sometimes found, the marble tiles were arranged in simple formations and were confined to smaller spaces such as the *voorhuis* [front entry, foyer], corridors and upper story sleeping or storage rooms. Because of its warmth and homeliness, wood continued to be the preferred material for flooring in the main living and reception rooms, even among those with considerable assets. Artists also overstressed the appeal of placing Turkish carpets on floors. This fashion, which before 1680 was restricted to the court of the Stadholder in The Hague, appears to have been seldom imitated. In contrast, the much more common practice of covering floors with simple matting is infrequently depicted in visual images of the interior.[3]

We are well advised, therefore, not to confuse the *reality effect* with the *reality* of the period.[4] The former speaks to the ways in which these paintings evoke daily life with an air of precision, all the while adding further

richness—often material, but also moral, political, and certainly aesthetic. Dutch painters adopt a natural or realistic style but carefully organize their compositions to reflect a particular view of society, one that conforms to aesthetic as well as social standards. What appears ordinary in their works is thus quite extraordinary; they offer an interpretation or idealization and not simply an imitation of the real. Seventeenth-century contemporaries of the artists recognized these painterly effects as we do today, albeit from a far greater remove.

The slices of life that Golden Age painters create reflect, unsurprisingly, deeply rooted cultural values. Wayne Franits notes, for example, that artists' renderings are consistent with texts from the period that refer to the separation of the workplace, where men prevailed, and the domestic sphere, where women fulfilled carefully delineated roles such as loyal spouse, dedicated mother, supervisor of the home and its servants: "Socioeconomic factors, namely, burgeoning capitalism and the concomitant privatization of the home, were . . . largely understood and justified in theological terms by contemporaries. Authors also justified their conviction that women run the household by what they perceived as disparities in male and female physical traits and capabilities. They argued that God had ordained the husband to provide for his family owing to his superior strength and intellectual abilities, while his wife, given her weaker nature, was to perform household tasks."[5] Christian teachings, adjusted to accommodate the new economy, entered the pictorial space. Adorning the walls of middle-class homes, images of bourgeois life had the effect of validating a lifestyle supported through commerce.

The Dutch amassed large fortunes during this period. Yet the burghers who grew wealthy did not revel in their new opulence, for they remained concerned that their fortunes would corrupt them. Simon Schama argues that the Dutch, fearful that they would somehow be consumed by the devil lurking in the goods they acquired through trade, found a way to harmonize ethics and a bountiful commerce, scripture and consumerism:

> Commodities that brought fortune, like the carcass of the whale, could be made to intimate an offsetting misfortune. Its bulky substance could even evoke the insubstantiality of worldly prosperity through scriptural and folklore associations as well as the torments of sin and redemptive penance. The food on which humanist morality might choke could be digested into a repertoire of ethical connotations, visual and poetic. It could work for,

rather than against, the regulations of a dietary regimen in which moderation was the norm and superfluity and meagerness were both frowned on. Or it could be consumed in festive rejoicing according to the rites and customs that exonerated it from suspicions of wanton self-indulgence. And that was made easier by the fact that some foods—wine and bread, for example—had long been imbued with sacred associations.[6]

God did not disappear. Burghers, however, validated their worldly activities through images that marked the ascendancy of the object from acquisition to art. The increased prevalence of decorative pieces in Dutch homes, as well as in inns and taverns and other public spaces, resulted from the decline of church commissions for artwork. Unlike the Catholics, Protestants believed that their churches should be austere and largely devoid of images. Protestants preached against the sins of the flesh. Yet art that purported to do the same did so with such a heightened technique, such visual appeal, that the religious message was, if not entirely lost, then frequently diffused by the more profane appreciation of the art object itself, with the result that the sins of the flesh remained ambiguously inscribed in them. Referring to a room containing six portraits of the prince of Orange or his relatives, and a painting of Cimon and Pero (*Roman Charity*) in which Cimon feeds her imprisoned father from her own breast, John Loughman and John Michael Montias observe that "in the context of the other pictures [the Cimon and Pero] must have been interpreted as a virtuous representation of filial piety rather than a thinly disguised erotic subject."[7] Nevertheless, paintings whose sordid and lurid qualities ostensibly served to teach and delight likely offered more delight than moral instruction. Critics frequently cite works such as Frans van Mieris the Elder's *Inn Scene* (c. 1658, Mauritshuis, The Hague) (fig. 2) as evidence of obscene or otherwise excessive behavior not easily dismissed as a stern admonition. Irresistibly evocative, van Mieris's fornicating dogs anticipate the seduction of the couple in the foreground and reinforce that of the couple standing in the doorway under a bed whose linens hang suggestively over the side.[8]

The considerable range of painterly subjects, which ran the gamut from drunken revelers to austere matrons, indicates that the Dutch took pleasure in contemplating different aspects of their world. Art afforded a certain respectability to even irreverent subjects, and the presence within a community, if not within an individual home, of images detailing so many different facets of ordinary life amounted to a veritable

FIGURE 2. Frans van Mieris the Elder, *Inn Scene* (*Brothel Scene*), c. 1658, oil on panel, 16 ⅔ x 13 ⅛ in. (42.8 x 33.3 cm). Royal Cabinet of Paintings, Mauritshuis, The Hague.

inventory of contemporary culture through which people could identify themselves. Whether paintings eventually led to moral considerations or simply allowed the pleasurable thoughts that the image produced to sustain themselves without the intervention of more restrictive narratives, such thoughts depended first and foremost on the artist's ability to render the scenes of daily life naturally, to make them seem real enough to be convincing. For, like moral preachings, pleasure here involves the act of recognition; the viewer must identify the subject, affirm its connection to life in the streets of Delft and other Dutch cities. Artists like Vermeer cultivated this aesthetic with such success that critics often cite visual effects as the sole attributes of their work. Seeing becomes an art in itself, an art assisted by developments in optics. Scientists in the Dutch Republic perfected lenses and new theories about the functioning of the eye. After science, art was perhaps the greatest beneficiary of this research. The accuracy of Dutch painters' renderings in some cases depended on improved lenses and optical instruments, such as the camera obscura (fig. 1), which enhanced depth of field.[9] Many artists who used lenses did so especially to improve perspective.[10] But the pervasive effects of optical devices were likely experienced even by artists who did not use lenses. They could imitate the canvases of fellow artists who perfected the application of these optical instruments. Even if they did not apply such techniques, artists likely absorbed some of the energy emanating from scientific circles. Their precise renderings of objects suggest how discussions about new discoveries within the scientific community may have begun to mediate what artists saw in the world.[11] They focused intently on the details of individual objects, just as scientists focused on small objects under increasingly powerful lenses.

The question remains: Does the visual alone order knowledge? The attention some critics give to the visual effects of Dutch genre scenes and still lifes in the seventeenth century compels us to inquire further whether knowledge is in fact bounded by the passage of stimuli from object to eye. Defenders of optics argue that vision constitutes the most intense use of the senses in gaining knowledge. Some contend, therefore, that we cannot extrapolate intellectual meanings from the visual qualities of Dutch paintings, or that we cannot do so without distorting the appeal of these works. Yet the meticulous compositions through which they showcase individual objects by transforming ordinary household items into forms of enduring beauty preclude our thinking that no deeper logic is at work in them. As they study the reflections of light and

the inspiration that it provides, Dutch painters invite us to consider the process, the very analytic process, through which they ascribe value to the things of their world.

No one has made the case for a science of art in this period more forcefully than Svetlana Alpers a quarter of a century ago in *The Art of Describing*. One of the early and most resonant voices of cultural studies, she meticulously detailed a theory of visualization that translates both the functioning of the eye and the pleasure of the eye as it beholds an image.[12] I return to her seminal work, however, in order to develop the theory of a science of art that is also a science of method. Like scientists interested in optics, Dutch artists sought to maximize the experience of perceiving objects. A viewer of many Dutch Golden Age paintings sees everyday objects in their *natural light,* meaning both within familiar settings and also imbued with a certain luminosity that results from the artists' attention to reflections, shadows, and the sheen of different textures. Alpers contends that the viewer appreciates these works as visual recordings that seek to tell no other story, impart no other meaning, than that of the objects themselves. She argues that with these works one does not so much interpret as *make sense* visually.[13] Still, if we accept the idea that these images actively participate in the shaping of culture as it communicates traditions, innovations, socioeconomic conditions, and aesthetic practices, Alpers's position leaves open the question of how a cultural identity, a particular knowledge, is ordered in the mind of the artist who conceives it, as in the mind of the viewer who experiences it. In her formulation the input is visual and the output, the art, is also visual. In this chapter I argue instead for the existence of a scientific connection with Dutch genre painting and still lifes that goes beyond optics to epistemology, that is, to a specifically Cartesian foundation of these works. First I introduce a concept of framing that differs from the one that Alpers applies in order to clarify my position with regard to her theory. I then link my concept of framing to the camera obscura and Descartes's *Dioptrique* [*Optics*] in order to articulate an aesthetics of science.

## Visual Effects: Vermeer in Context

Citing as a model Kepler's demonstration of how the retina records images on its surface, Alpers argues that Dutch Golden Age paintings depict objects exactly as the eye processes them (although the retina produces an inverted image).[14] She emphasizes a decidedly anti-intellectual art, a

rejection on the part of Dutch artists of the text and hermeneutics in favor of the image-as-everything. Alpers distinguishes the northern (Dutch) tradition of Vermeer and his contemporaries from the Italian Renaissance tradition. Through their reliance on known histories, myths, and biblical subjects, Italian artists, as Vasari observes, teach the viewer to read and interpret the scenes they depict. Alpers notes further differences. The Renaissance tradition pays attention to a few large figures; it models objects through light and shadow; it concerns itself with the placement of objects in a legible space. The Dutch tradition instead pays attention to many small things; shows the reflections of light off objects; dedicates itself to the surfaces of objects, their colors and shadows.[15] I believe that "smallness" further indicates a will to classify, the deliberateness with which many painters of the Dutch Golden Age attend to the details of their everyday existence. Alpers concludes that the Dutch conceive ways to capture the visual so that it, the visual impression, rather than any specific content, predominates.[16] The Dutch do capture on their canvases what they see, surface by surface, texture by polished texture. If the result is a new emphasis on picturing the real, however, this aesthetic is in turn grounded in ordering and measuring, the very principle that guides Cartesian science. In Dutch genre paintings and still lifes, the presence of many small things creates a visual taxonomy that we must assess in other than purely visual terms.

Kepler understood vision to refer exclusively to the eye as a mechanism for receiving and recording light rays. He of course recognizes the existence of an observer whose mind processes the signals it receives from the eye. But the actual imprinting of the image on the retina happens directly, unmediated by thought. In this sense, Alpers correctly insists on Kepler's concept of vision as referring to an eye that requires no viewer.[17] Kepler documented that the image the astronomer sees is distorted as a consequence of its being projected, first inside the pinhole camera (a precursor to the camera obscura) and then in the astronomer's eyes.[18] For Alpers the idea of representation as distortion invites a parallel in art, where the notion of a picture sans referent defines the image as artifice: "It was Kepler who for the first time turned away from the world to a representation of it, to the picture of it on the retina. In structural terms, Kepler not only defines the picture on the retina as a representation but turns away from the actual world to the world 'painted' there. This involves an extraordinary objectivity and an unwillingness to prejudge or to classify the world so imagined."[19]

Alpers offers Vermeer's *View of Delft* (plate 7) and Willem Kalf's still lifes as examples of "distortions," or recorded images that are consistent with the scientist's practice of interpreting an object as it appears in the eye (rather than in the world):

> We might then consider Vermeer's *View of Delft* not as a copy done after a camera obscura . . . but as a display of this notion of artifice. A claim is made on us that this picture is at the meeting-place of the world seen and the world pictured. That border line between nature and artifice that Kepler defined mathematically, the Dutch made a matter of paint. And when we turn to works like the still lifes of Kalf we have to consider if, more often than scholars have been willing to admit, deception here engages not a moral but an epistemological view: the recognition that there is no escape from representation.[20]

The problem lies in seeing that the eye's "objective" record of things does not equal their depiction on the artist's canvas. While the eye takes in all that lies within its purview, all that it "sees," the artist consciously fragments what he observes, offering but a piece of what stands before him. Scientific representation and painterly representation are both artificial in that images, rather than things, become the object of attention. To say, however, that this artifice is somehow equivalent to an "epistemological view" is to leave out the essential core of the process. Knowing takes effect as the artist separates out what is true (valid) from what is false in what he sees. His organization of elements in the painting validates this meaning. Informing a view of the world, painted objects function not as images solely but rather as identities, images that the mind interprets. Dutch genre paintings do not evidence the clear pre-text, that is, the specific narrative context, what Alpers terms the "frame," essential to so many Italian Renaissance works. Other morals and culture-specific themes, however, substitute for the great histories and myths. Although the content has shifted to a new focus on the everyday, Dutch artists continue to paint for a viewer, whether patron or, in the best of circumstances, posterity itself. Alpers does not push the question of representation far enough to explore what logic grounds the new content; she does not interrogate the network of associations through which Dutch artists fashion a cultural identity. Knowledge, however, hinges on an appreciation of representation as a table of knowledge, a model of the very "willingness to classify the world" that Alpers dismisses.

Her characterization of the image as an "unframed" space rejects the very notion of boundaries that I see as essential: "The image spread out

on the pictorial surface appears to be an unbounded fragment of a world that continues beyond the canvas . . . the world staining the surface with color and light, impressing itself upon it; the viewer, neither located nor characterized, perceiving all with an attentive eye but leaving no trace of his presence."[21] The notable absence of a prior textual tradition notwithstanding, Dutch genre paintings do invite us to interpret them. They do so, I argue, by imposing a frame. In making this claim I am not denying what Alpers sees; her idea of a frameless image works well as far as it goes. Rather I am positing the existence of a frame structure, or overarching epistemological system, which governs even this "framelessness." Today computers allow us to crop an image and make a print of the cropped segment alone. We see the new image framed within the original. The man in the commercial for a digital printer who places, literally, a frame around his neck to generate instantly, through the wizardry of computer technology, a photo of his head is not really his photo but remains its inescapable referent. In Dutch genre paintings we know that a table whose legs are concealed under an oriental carpet has legs and, likewise, that the glass shimmering in the light of a window presupposes the sun in the sky. The relation of part to whole, moreover, grounds any system of classification. Dutch artists, I maintain, convey knowledge much as a scientist does, piece by piece.

I use the concept of the frame to delineate the organization or composition of genre paintings and still lifes, and of Vermeer's work in particular. The frame structure refers to the grid of possible combinations of identities that a text or image allows. It denotes the system responsible for all possible associations of elements within the image, all meanings that it can produce. More specifically, the frame of an image refers to the formal patterning of a work (juxtapositions, replications, magnifications), the paradigms that it establishes internally, within the actual frame of the painting (its physical borders). Thus the case of the "viewer viewing the internal viewer viewing" establishes the paradigm of the gaze as a model of framing in a work devoted to a celebration of art.

Alpers considers Vermeer's *View of Delft* to be "the consummate example" of the visual effects that she describes. "Delft," she explains, "is hardly grasped, or taken in—it is just there for the looking."[22] Delft looms before our eyes as we consider the imposing scene: none of the figures in the foreground, two gentlemen and four ladies, the one on the far left holding a child, directly appreciates the view of Delft, so engaged are they in their various conversations. Such an implicit rejection of the internal

observer function within the painting further emphasizes that the beholder comes upon a scene already "there for the looking." But it also suggests that the important function of viewing the scene, of knowing what it signifies, remains ours. No one in the painting engages in the activity that engages us, as it formerly engaged Vermeer, namely, the contemplation of Delft as a subject worthy of art. Delft's "just there" status impresses us as decidedly singular, the source of an arresting pleasure. Delft stands there, but we reckon with it, come to know it as well as see it. We do so, moreover, because the painter draws us in, because his composition orders a *View of Delft,* and not simply Delft as it exists in real time and space, even though Vermeer certainly stood there, in real time at a specific location, and chose what elements of the scene to reproduce in his image.[23] Not only the painter but also the viewer occupies the critical position outside the painting, the vantage point from which its diverse lines and colors coalesce in an image of Delft. Knowledge depends on the organization of the painting as it registers both in the eye and in the mind of the viewer, just as it has in the artist's eye and mind.

Vermeer's image of Delft gives the impression of unbounded space, as Alpers indicates. It is not impenetrable, however, a surface that merely reflects the light. Contemplating Vermeer's masterpiece, we admire the scene's beautiful stillness, its realism, as well as Vermeer's technical accuracy in reproducing the proportions of sky, city, and humans, the play of light and shadows. What we identify through the painting differs from what a contemporary of Vermeer would observe if he stood opposite the scene at precisely the same time of day. Vermeer has made certain modifications to the actual topography. Arthur Wheelock, basing his conclusion on a study of x-rays, reveals that "Vermeer compressed the cityscape into a dense frieze by simplifying the city's profile and spreading out its forms."[24] Furthermore, a viewer would not take in the same details if the image were not cropped so that the building on the left were cut down the middle to expose Vermeer's framing. The knowledge conveyed through the painting is not natural but artificial, not real but imposed. We ask: Why this view and not another? Why have the sky occupy more space than the shore or the river? The large vertical expanse imposes a meaning on the city. Extending beyond the upper frame of the painting, the sky's dark clouds belong to an infinite space that reflects the power and mystery of nature. Measured against this expanse and that of the harbor water below it, the smaller, more compact yet equally expansive view of the city extending left and right and also deep into the painting

hints at man's submission to nature even as he controls the waterways and endeavors, as a pair of barges for transporting cargo evokes, to prosper through trade. At the time Vermeer painted this image, Delft's economy was weakened relative to that of Holland's other main cities, although the economy of the Republic remained strong.[25] One could therefore further associate the moored barges and even the dark clouds with a certain unease of a city stilled. Wedged rather narrowly, despite its prominence, between the sky and the water, the city of Delft, as reflected in the shadow the city casts on the water, remains subject to a force it cannot navigate, the force of nature as it conveys the weight of God, fate, and fortune.

My various associations are intended to demonstrate that although no definitive reading of it, or any painting, is possible, Vermeer's *View of Delft* invites contemplation; it structures an identity for Delft and for the Dutch. With or without the commercial emphasis, with or without a reference to divine powers, the painting informs us that even if, consistent with Alpers's thesis, no preexistent model orders the painting, Vermeer is nonetheless framing a view of the city that is simultaneously a sighting and an interpretation. *View of Delft* exemplifies how art informs us not only that to see is to know but also that what we see is what the painter orders into an image that obeys its own distinct logic, that reflects no reality outside of itself as much as it reflects its own power to shape identities, to call attention to things and to make them signify. Hence, if Vermeer's painting, like the genre paintings and still lifes of many of his contemporaries, seems realistic in contrast with the Italian narrative tradition in terms of both style and subject, its structuring of knowledge appears far more deliberate, indeed far more staged, than either the term "realistic," from the nineteenth century, or Alpers's "descriptive," with its emphasis on visual impressions, implies.

We must not equate the absence of a single perspective with the absence of a structure for knowledge. Alpers explains that Vermeer does not, like the Italian inheritors of Albertian geometry, begin "with the viewer who is actively looking out at objects—preferably human figures—in space."[26] Pascal Dumont confirms that *View of Delft*

> n'y est pas, comme dans la perspective albertienne, une fenêtre depuis laquelle on jouit du point de vue privilégiée propre à révéler l'ordre latent d'une scène. Il ne suppose pas une position singulière à partir de laquelle la structure cachée de l'espace représenté va se dévoiler à l'œil.

> [is not, as in Albertian perspective, a window from which one enjoys a privileged point of view that enables one to perceive the hidden order of a scene. It does not suppose a unique position from which the hidden structure of the space represented is going to reveal itself to the eye].[27]

The cityscape of Delft flows in an expansive band across the middle section of the painting. Certainly, this seemingly limitless extension captures the viewer's gaze, as does the light over the rooftops in the center, creating an effect of depth. Yet Dumont goes on to note the particularly Cartesian orientation of such a perspective:

> C'est au contraire l'étalement sur une surface plane de divers types d'informations qui sont accumulés (la multitude de détails) et vus de nulle part: c'est une représentation construite et non la vision d'un œil concret. En ce sens le paysage hollandais est bien une image cartésienne, puisqu'il se donne à voir moins pour un œil de chair y retrouvant une présence, que pour une *intuitio mentis* capable de saisir dans cette construction ce qu'aucun œil ne voit jamais.
>
> [It is on the contrary the display on a flat surface of different types of information that are accumulated (the sheer number of details) and nowhere seen: it is a constructed representation and not the vision of an actual eye. In this sense the Dutch landscape is a Cartesian image, since it allows itself to be seen less for the benefit of a real eye that sees a presence in it than for an *intuitio mentis* capable of recognizing in this construct what no eye ever sees.][28]

Dumont argues persuasively that Vermeer's *View of Delft* celebrates the image not as a purely visual sensation but rather as a construct, an idea, consistent with Descartes's notion that sense impressions pass through the window of the eye into the mind. The purely visual appreciation that Vermeer's *View of Delft* affords, though it commences in the eye, must, in turn, be apprehended by the mind; knowledge, our understanding of the image, requires the application of reason. Our knowledge of Delft originates not in the actual city but rather in Vermeer's reconceptualization of it. Dumont's notion of a "constructed representation" refers to a world of signs, that is, to the artificial organization of elements into a system. While art appears to celebrate the image as a purely visual splendor, it also validates the system of categorization through which this image acquires meaning. The physical frame of the painting is but a stand-in for the logical framework, or system, through which individual identities are

cataloged, assigned meaning within the functioning of a larger whole that is knowledge.

I have suggested that for the scientist the frame is equivalent to a taxonomy, a table of elements into which he filters the facts that he uncovers. Vermeer's compositions similarly work not simply to give a view of the world but to order this view. To frame without an Albertian frame, as in the *View of Delft*, is still to construct meaning, to order all the necessary elements within the four sides of the canvas. For the Dutch devoted to cataloging their word in art, these meanings derive in large part from material culture. Thus water is not simply an element of the natural landscape; it supports profitable trade routes, the envy of other European nations that wage war with the Dutch in large part to acquire access to goods and markets across the oceans. Were we to proceed into the city of Delft which looms beyond the docked boats in Vermeer's painting to obtain a glimpse of the homes that lie within it—indeed, were we to access views of these homes in other paintings by Vermeer—we would see further evidence of rich but unostentatious rooms where instruments, clothes, and furnishings inform a view of both privilege and restraint.

Vermeer and his contemporaries effectively transform a potentially threatening consumerism into the viewer's voyeuristic pleasure, a pleasure rooted in a discrete ordering of things within the private sphere. Individual and, frequently, ordinary objects—a piece of fruit, a crust of bread—attract the viewer's gaze. They serve to imbue the entire scene with a sense of harmony, the fullness that comes from knowing that all things are worthy of attention. Once painted, the luster of crystal and the sheen of silver plates and bowls, all purchased items, stand on equal footing with apples from the garden tree caught as they reflect the light filtered through the windowpanes. In Dutch genre paintings and still lifes, material possessions, like ripe fruit, bread, and fish, become more than signs of plenty, more than signs of religious devotion—more, even, than signs of the artist's skill in rendering them so precisely. Objects are displayed, set out, not to be consumed once and for all but to be delected for eternity.

Affirming the Dutch burghers' identity as collectors, artists not only stress ownership but also identify that ownership as art, and as art that self-reflexively validates their existence by taking the simplest elements of their world, and hence themselves, as its privileged subject. Painted objects do not so much dazzle as reassure the viewer through what I call

an "aesthetics of order." The aesthetic pleasure that these paintings afford extends beyond the beautiful and the transcendent values that art assigns to things, both ordinary and extraordinary, by defining them as cultural artifacts. Whatever the natural or inherent appeal of objects in real homes, within the painting they acquire value because they are individualized. The *something more* that art offers therefore derives as well from associations of collecting with the eminently scientific practice, which many prosperous Dutch burghers also enjoyed, of assembling specimens for display. Collectors' cabinets, genre paintings, still lifes, and science's table of elements all evidence the same propensity to order identities, the smallest units of knowledge. Dutch artists celebrate the pleasure that one obtains when things are put in their rightful place, as this implies, in the quintessentially Cartesian sense, their place within a table of elements. In art, objects have value not only as things made and consumed but also as part of a representation through which the Dutch identify themselves to themselves and to posterity. In this context even paintings showing excessive drinking, rooms where the mistress enjoys the company of a soldier while the master is away, and even laundry document the everyday, and therefore help to flesh out an order of knowledge.[29] Whatever negative connotations society may ascribe to them, in art, ordinary household objects are framed, assigned an identity as part of the cultural patrimony.

Depicting objects that the bourgeois acquire either through direct trade or from profits gained through trade, Dutch painters in effect lay out a table of identities. Things are ordered through a progressively hierarchical series of categories, or like types, much like elements in a scientific taxonomy. The half-peeled lemon in Willem Kalf's *Still Life with a Late Ming Ginger Jar* (plate 8) did not fall from the tree onto the silver tray in front of a peach and a Chinese jar. Citrus fruits did not grow in Holland. Indeed, the painting offers a collection of exotic items. Like the Mediterranean lemon and peach, the Venetian glass, and the oriental carpet, the Ming ginger jar conveys a fascination with the aesthetic appeal of objects from abroad that, for the Dutch, remains indissociable from the pleasure of acquisition, and therefore signifies wealth, status, and worldliness as well. The peel left to drape down the side of the table and the reflections of light on the glasses (the one in the center rests on a gilt putto with a horn of plenty) celebrate less the natural qualities of the lemon or the glass than the artist's skill in capturing them. The careful selection and positioning of the objects here and in the many similar still

lifes that Kalf executed underscore the painter's active engagement in the composition and the fact that to apprehend it, we too must interpret this particular grouping of objects by considering each of its elements in turn. To Alpers's insistence that Dutch art is descriptive, therefore, I further specify that its description is a deliberate *display,* a careful ordering of things.[30] The difference is critical, for display brings the pictorial into the classical episteme, into knowledge.

The distinctly taxonomic quality of Kalf's painting, with its meticulous arrangement of objects, is hardly an isolated case. Consider two still lifes from Amsterdam's Rijksmuseum: Balthasar van der Ast's *Still Life with Fruits and Flowers* (plate 9) and his student Jan Davidsz. de Heem's *Festoon of Fruits and Flowers* (plate 10). They present several common features. Flower arrangements tame nature by placing it (or relevant samples of it) into a vase and organizing it. These arrangements express a cultivated and not natural order of things. Axel Rüger notes that the Dutch were not inclined to place flowers in vases, where they would quickly wilt.[31] On account of their high cost, flowers were instead planted as prized specimens for admiration in gardens that served, much like the collectors' cabinets of this period, as areas of display. Unaffordable to all but the wealthiest citizens, gardens filled with exotic flowers, like their material counterparts inside, served both to celebrate the prosperity of their owners and to expose them to more exotic fare.[32] As with Kalf's still lifes, van der Ast's Chinese porcelain, citrus fruits, and exotic shells, like de Heem's Spanish grapes, pomegranate, peaches, plums, and other varieties of fruit not grown domestically, offer an enticing rendering of the Dutch environment as the Dutch, and especially the middle class, enhanced it to suit their needs and desires. They coupled the patrons' real appropriation of such products—things they acquired and, in the case of food, consumed—with the cultivation of imaginary pleasures tied to places that the objects evoked.

Van der Ast's shells and insects and de Heem's butterflies and beetles are so finely painted as to constitute still lifes within the still lifes. Even these and other fragile and transitory objects frequently associated with death are replicated so exactly as to offer a veritable catalog of nature's bounty. The artists present a world of mirrored delights, a celebration of nature available to those who take possession of it both visually, as signs of life's intricate patterns, and intellectually, as part of an awareness of the natural wonders that science, aided by microscopes, had classified.[33] The painted flowers were created, via the mediation of botanical tax-

onomies, to look natural: "Following botanical illustrators . . . many still-life painters claimed that their still lifes were made 'after life,' i.e. that the flowers were painted from an actual bouquet in front of the easel. From various studies it is now known that this cannot have been entirely accurate. In many cases, flowers that bloom in different seasons were depicted together. In other instances, paintings of flowers or shells are recognisable from earlier prints."[34] Florilegia, collections of flower prints, circulated widely. Merchants found customers for the products depicted in these picture books, and artists used them as models for shells, rare tulips, and other items.[35] The connection between art and botanical illustration underscores a critical link between art and science in general, and between painterly composition and taxonomy in particular. Artists, whether of still lifes, genre paintings, landscapes, or histories, frequently made studies of individual figures and objects before composing them into plausible scenes. Still life painters of botanical illustrations, however, relied specifically on scientific documents, on catalogs of flowers destined to advance the work of botanists. The artist who consulted the florilegia had familiarity with, if not an actual taxonomy, then taxonomic organization as related to the naming and identification of plants. Thus, more than sources of images for the artist to copy, these works may have reinforced the artist's implicit understanding that he was participating in a project, a quest to order knowledge that "was in the air." Though it originated in the scientific community, the effort to identify and classify the world was a broad-based cultural phenomenon which permeated different realms of society.

Were Descartes to analyze a Dutch still life, he would not be able to evaluate what the artist had selected *not* to include, of course, although the choice to exclude, as well as that to include, formed an essential part of the artist's conceptualization of the work. The philosopher would likely inventory all objects in the painting, identifying the various flowers, insects, and other items. He might then organize these objects according to size, color, season, price, country of origin, and so on. One wonders whether such a meticulous classification would allow the reader of the text to know the objects as well as or better than the painted image would permit him to on its own. Through the aid of the botanical illustrations, Descartes could subdivide the flowers that do not bloom in the same season, providing the casual observer with information that the still life obscures by having them appear together. Would the likely buyer of the painting be a casual observer, however? The Dutch had become

connoisseurs of flowers. Tulips, in particular, became a craze, leading to elevated prices. Schama reports that by the 1630s, "a second generation of horticulturalists began to break out from this relatively genteel and circumscribed trade and to change the conditions of distribution and sale."[36] Prices escalated, encouraging artisans and ordinary merchants to buy along with wealthy members of the middle class.[37] When the tulip market crashed in 1636, the results were disastrous. One cannot imagine, therefore, that the buyers of still lifes would have remained unschooled in many of the varietals of flowers on the market. They may have known as much about them as a botanical illustrator or as Descartes could glean in his fictional role as observer of the painting. The point is that in each domain—trade, horticulture, botanical illustration, botanical research, art—we detect a deep commitment to assembling elaborate collections, evidence of a cultural penchant for classification. Even if the wealthy alone amassed impressive collections of precious items, others, including servants, also knew of them and, in the case of tulips in the garden, certainly observed the trend to compile and display.[38]

Descartes believed that the mind orders the things it studies and that it has the capacity to unify all things. This theory had the effect of encouraging scientists to pursue work within their more narrowly defined fields of investigation rather than seek a general, or encyclopedic, knowledge. In her study of various forms of classification in the classical period (catalogs, the organization of libraries, textbooks, curricula, the functioning of learned societies, and journals), Lorraine Daston notes a persistent tension between a unified vision of knowledge, on the one hand, and a fragmented reality, on the other. Buoyed by the theory that the data scientists obtained within a particular discipline would necessarily connect to critical material from the other disciplines, seventeenth-century French science became more specialized even as it sought a unified and complete knowledge. Investigations concentrated on individual facts derived from individual things. Refinements in the design of microscopes and telescopes produced a significant number of new botanical and zoological specimens, as did travel to previously unexplored regions of the globe. Daston explains that the information was so voluminous as to exceed the ability of existing classificatory systems to order it coherently. In this world awash in data, an alphabetical compartmentalization could mean as much as a theoretical categorization. As scientists endeavored to record the existence, forms, and functions of objects, the sheer quantity of information thwarted their intended leap toward universals.[39]

Dutch art, I believe, speaks to this very problem. Vermeer's work, and in particular the reception of that work in the last century, helps to explain why. Noting his very "impressionistic" style (albeit an anachronistic designation), some art historians have concluded that names and categories remain foreign to Vermeer's art, and that, consequently, his paintings offer no knowledge to the viewer. Lawrence Gowing makes this point emphatically: "The description is always exactly adequate, always completely and effortlessly in terms of light. Vermeer seems almost not to care, or not even to know, what it is that he is painting. What do men call this wedge of light? A nose? A finger? What do we know of its shape? To Vermeer none of this matters, the conceptual world of names and knowledge is forgotten, nothing concerns him but what is visible, the tone, the wedge of light."[40] While many art historians would disagree with Gowing's interpretation, I cite it because it leads logically to Alpers's assessment, quoted earlier, that Vermeer's insistence on capturing visual impressions implies "an extraordinary objectivity and an unwillingness to prejudge or classify the world."[41] I take issue with Gowing's bold assertion. It is one thing to consider the heightened visual effects, as both Gowing and Alpers (and virtually all art historians writing on Vermeer) do. It is yet another positive step to situate, as Alpers does, the visual effects of Dutch Golden Age painting within a culture so evidently attuned to advances in optics. I maintain, however, that the accent on the visual at the expense of the conceptual goes against the letter and the spirit of science in the seventeenth century—science as a quest for knowledge based on the application of reason.

In an extensive and highly laudatory analysis of Alpers's book which emphasizes how she has opened art history to cultural influences, Louis Marin notes that the Keplerian model allows Alpers to argue for a "disanthropomorphic" vision: "Le monde est premier, se projetant en lumière et en couleurs dans un 'œil mort.' Le modèle de la vision, c'est-à-dire de la peinture, est un modèle passif dont est éliminé tout sujet constructeur" [The world comes first, projecting itself in light and colors onto a 'dead eye.' The model of sight, that is, of painting, is a passive model from which any active subject is eliminated].[42] I emphasize, however, that the composition of a Dutch genre painting reflects the clear engagement of the painter who decides to include certain forms, to juxtapose them, and to choose the values that govern their juxtaposition, just as he decides to adopt a particular "unframed" perspective as Alpers has defined it. All painters compose; and all compositions frame, or mold, the viewer's un-

derstanding. Whether or not the artist's intentions correlate exactly with the beholder's understanding (and an exact correlation is unlikely), we cannot properly explain the effects of the painting without considering the careful ordering of identities within it. The secret of Dutch painting is not that it describes, but rather that it reveals the mind as it contemplates itself in the art and act of describing.

Alpers writes: "If we concentrate on a detail—on the hand of the painter, for example, in the *Art of Painting*—our experience is vertiginous because of the way the hand is assembled out of tone and light without declaring its identity as a hand."[43] In France it is, as Marin reminds us, Pascal's celebrated *pensée* that captures the essence of both classification and perspective: "Une ville, une campagne, de loin c'est une ville et une campagne, mais à mesure qu'on s'approche, ce sont des maisons, des arbres, des tuiles, des feuilles, des herbes, des fourmis, des jambes de fourmis, à l'infini. Tout cela s'enveloppe sous le nom de campagne" [A city, a countryside, from far away it is a city and a countryside; but as one approaches, they are houses, trees, tiles, leaves, grass, ants, ants' legs, to infinity. All this is enveloped in the word "countryside"].[44] So it is with Vermeer's painting: the closer one moves toward it, the more one loses oneself in the brushstrokes and colored shapes. The hand loses its art and becomes pure technique, a surface of colors and forms. But Vermeer intends us to view the painting from a certain distance, from a definite perspective that allows the individual brushstrokes and colors to come together as a hand. This object coheres with the others he has delineated, allowing us to name and to know them within the intimacy of the scene he creates. Marin disagrees: "Expérience vertigineuse: l'œil se perd dans la surface où les représentations de choses perdent définitivement les mots qui les désignent et les identifient" [A dizzying experience: the eye loses itself in the surface, where the representations of things definitively lose the words that designate and identify them].[45] Marin reads Pascal's *pensée* as distorting the classical perspective. Pascal, Marin says, shifts the viewer's point of reference so that the country appears to be broken up into a series of things: "la prolifération des singularités: apparente fécondité des choses" [the proliferation of singularities: the apparent fecundity of things].[46] Although Pascal defamiliarizes perspective, he does so in such a way as to expose the underpinnings of the chain of identities within the class of things belonging to the countryside. For Pascal the view does indeed supply a name: *campagne*. Thus the final effect is not one of dissolution; Pascal expands identities within a single category:

*countryside.* Like a scientist, he sets down and then completes his taxonomy. His (accurate) sense of the infinite dimensions of the task notwithstanding, Pascal, we observe, is, ironically, very Cartesian in his approach to the problem.

Indeed, Pascal's *pensée* about the countryside conforms to Foucault's notion of *calcul*; it demonstrates the eminently classical articulation of the relation between things. The latter takes one from a purely visual appreciation and into a mode of thought in which differences can be assigned and calculated: "[La *mathesis*] ramène . . . tout le champ du visible à un système de variables, dont toutes les valeurs peuvent être assignées, sinon par une quantité, du moins par une description parfaitement claire et toujours finie" [(*Mathesis*) reduces the entire visible field to a system of variables, all of whose values can be assigned, if not in terms of a fixed quantity, at least according to a perfectly clear and always finite description].[47] Foucault here refers specifically to natural history as it developed in the eighteenth century, but he clarifies precisely what is lost, unavailable to knowledge, when the visual functions alone. As I explained in the introduction, Descartes believed that a science based on mathematics offered an ideal language, or method, for understanding the world. To say that Dutch painting resists interpretation by recording the play of light and color on the surface of things does not preclude their being named within the ideal language of method. Such identification does occur, and does so through, and despite, an impressionistic style. No one fails to recognize that it is a hand that Vermeer has painted. No one mistakes the red hat of his *Girl with a Red Hat* (c. 1666–67, National Gallery of Art, Washington, D.C.) for a pipe (*pace* Oliver Sachs and Magritte).

Through their extraordinary attention to the details of objects and compositions, the Dutch set in place a body of knowledge. If we were to imagine laundry, even freshly washed, or the maid who puts it away, in Vermeer's painting *Woman Holding a Balance* (plate 14), these additional elements would compromise the elegance of the scene, the exquisite beauty it evokes, even as they rendered the slice of life more comprehensive and arguably more authentic. Dutch artists offer both a heightened technique, an improved visual record of their everyday reality, and a more acute understanding of how method is critical to any fashioning of ideas. In addition to contributing to an image of commercial success, the display of richly patterned curtains, flower arrangements, paintings, maps, cloths, jewelry, crystal, oriental dishes and carpets, oysters, and

even the lemon peels unfurled from the fruit in genre paintings and still lifes attests to another kind of self-fashioning in art. We see displayed the many objects that signal the great commercial success of the Dutch. The inventory of items from this collection does more, however, than affirm economic prosperity and increased globalization. Consider the fact that many of the same objects recur in different paintings. Vermeer uses the identical map of Holland and West Friesland, designed by Balthasar Florisz. van Berckenrode in 1620 and published by Willem Jansz. Blaeu a few years later, in *Officer and Laughing Girl* (c. 1658–60, Frick Collection, New York) and in *Woman in Blue Reading a Letter* (c. 1662–64, Rijksmuseum, Amsterdam); *The Finding of Moses* in *The Astronomer* and in *Lady Writing a Letter with Her Maid* (c. 1670–72, National Gallery of Ireland, Dublin); the same painting of the procuress in *The Concert* and in *A Lady Seated at a Virginal* (c. 1673–75, National Gallery, London); the same Cupid sometimes attributed to Caesar van Everdingen in *Girl Interrupted at Her Music* (c. 1660–61, Frick Collection, New York) and *A Lady Standing at a Virginal* (c. 1670–72, National Gallery, London); and perhaps the same model in *The Astronomer* and *The Geographer,* who appear, moreover, to be in the same room before the same chest. Painters often shared the same objects as props.[48] Thus the similarity between pitchers in different paintings does not just reflect a common style of the day but may indicate that the actual pitcher is the same, colored and sized differently to complement the other things the artist has included.[49]

We can organize these data into a table structured as a nested hierarchy of groups of objects embedded one inside the other: objects that artists used; objects that artists painted; objects in the world. This taxonomy assists us in seeing the artificial and sometimes arbitrary ordering that the artist undertakes. If we think of a large canvas of paper gridded into one-inch units to aid in perspective, along with a finite number of objects, we can shift the position of these objects as if they were playing pieces in a board game. The grids, like the window mullions that guide the flow of light into a room, represent the categories. The borders of the canvas, like the walls of a room, represent the limits of the system of which the categories form a part, the system through which the artists define the real. A Ming bowl, though not Dutch, does have a place within the Dutch table of elements, where it signifies not a vessel used for food in China but a decorative object assimilated into the Dutch experience. Similarly, a fossil included as part of a painting depicting a collector's

cabinet assigns value to the collection. That is, the painting identifies the artifact more as a collected object, a prized item within a Dutch home, than as an element of natural history.[50]

Dutch artists combine and recombine groups of objects, adjusting their proportions, colors, and textures to suit a particular image. All artists do this, of course, but the Dutch do so while cultivating the illusion that what they show is real. The ultimate consequence of the artifice, however, is not that the image they create becomes a distortion, but rather that the accumulation of detail in these works, particularly when considered together, serves to inform a kind of causality. The paintings invite the viewer's scrutiny of objects—a comparison of small and large things, dull and polished surfaces, hard and soft textures. This visual apprehension in turn engages the viewer in a series of judgments. There can be no perception of things without the application of categories of reason. And the very arbitrariness of some of the artists' choices in turn encourages us to see the system of classification not as evidence of a unique and divinely inspired order of things but rather, consistent with the material and commercial emphasis of seventeenth-century Dutch culture, as demonstrating human preference and a will to power. That this will to power should be consonant with the will to know comes as no surprise. Both reflect a desire to control, to have in one's possession the things that allow one, as Descartes understood, to know so as to be able to predict, and to predict so as to be able to improve the physical conditions of existence. From Descartes's universal truth to the materialism of the Dutch, albeit filled with respect for God, there is less of a leap of faith than a leap of construction, of rational thought. The latter hinges on the relation of part to whole as expressed through embedded texts and embedded images, central paradigms within the table of identities that Descartes and Vermeer set in place. The camera obscura, the room into which life enters in perfect proportion, offers the ideal space for exploring these relations.

## Camera Obscura: The Science and Art of *Mise en abyme*

Invented well before the seventeenth century, the camera obscura gained prominence during this period.[51] Scientists such as Kepler and Descartes experimented with the device to study optics because they believed that it replicated the functioning of the eye. Artists used the camera obscura to assist with perspective. It consists of a box or a darkened room (the

**PLATE 1.** Rem Koolhaas, Seattle Central Library. Photo courtesy of The Seattle Public Library.

**PLATE 2.** Jan van Eyck, *The Arnolfini Portrait* (*Arnolfini Wedding*), 1434, oil on oak, 32 ¼ x 23 ½ in. (81.8 x 59.7 cm). National Gallery, London. Erich Lessing/Art Resource, New York.

**PLATE 3.** Diego Velázquez, *Las meninas* [*Ladies in Waiting*], 1656, oil on canvas, 125 ⅛ x 108 ⅝ in. (318 x 276 cm). Museo del Prado, Madrid. Erich Lessing/Art Resource, New York.

PLATE 4. Johannes Vermeer, *The Art of Painting,* c. 1666–67, oil on canvas, 47 ¼ x 39 ⅜ in. (120 x 100 cm). Kunsthistorisches Museum, Vienna. Erich Lessing/Art Resource, New York.

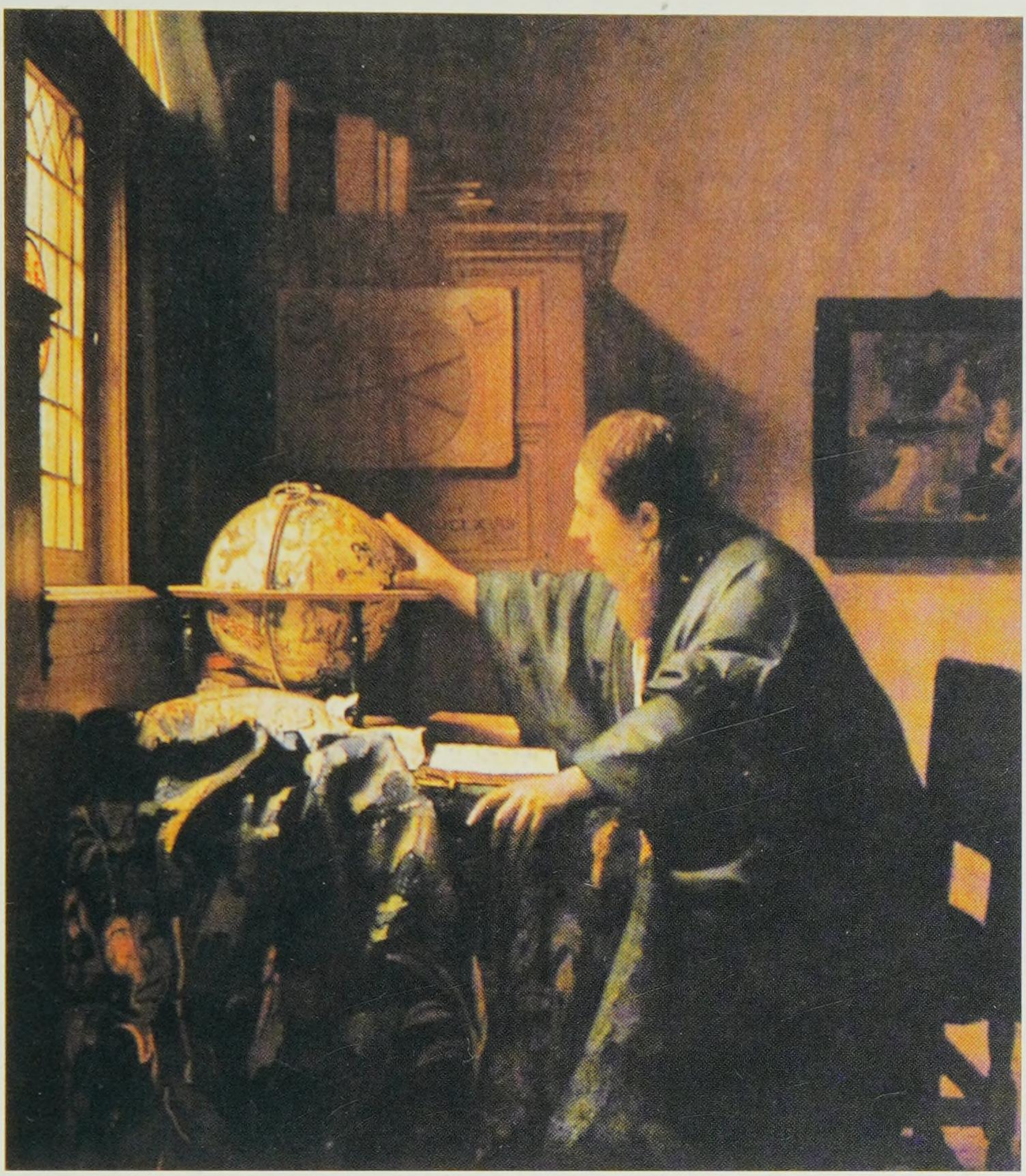

**PLATE 5.** Johannes Vermeer, *The Astronomer,* 1668, oil on canvas, 19 ⅝ x 17 ¾ in. (50 x 45 cm). Musée du Louvre, Paris. Réunion des Musées Nationaux/Art Resource, New York.

**PLATE 8.** Willem Kalf, *Still Life with a Late Ming Ginger Jar,* 1669, oil on canvas, 30 ⅓ x 25 ¾ in. (77 x 65 cm). Indianapolis Museum of Art, gift of Mrs. James W. Fesler in memory of Daniel W. and Elizabeth C. Marmon.

**PLATE 9.** Balthasar van der Ast, *Still Life with Fruits and Flowers,* c. 1620–21, oil on panel, 27 ½ x 15 ⅜ in. (69.8 x 39.2 cm). Rijksmuseum, Amsterdam.

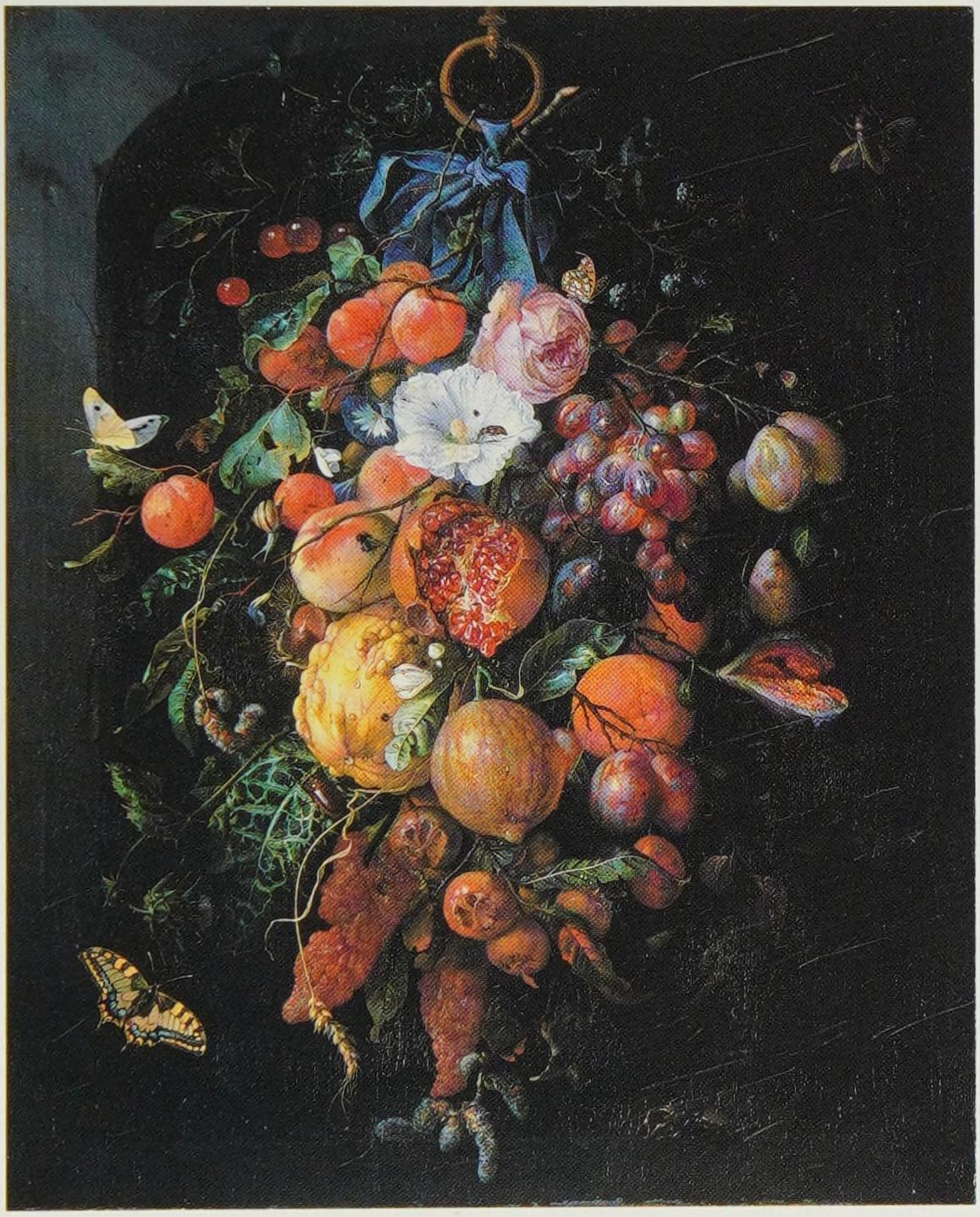

**PLATE 10.** Jan Davidsz. de Heem, *Festoon of Fruits and Flowers,* c. 1660–70, oil on canvas, 25 ½ x 23 ⅝ in. (64 x 60 cm). Rijksmuseum, Amsterdam.

PLATE 11. Johannes Vermeer, *The Concert*, c. 1665–66, oil on canvas, 28 ½ x 25 ½ in. (72.5 x 64.7 cm). Isabella Stewart Gardner Museum, Boston. Bridgeman Art Library.

PLATE 12. Johannes Vermeer, *The Music Lesson* (*A Lady at the Virginals with a Gentleman*), c. 1662–64, oil on canvas, 28 ⅞ x 25 ⅜ in. (73.3 x 64.5 cm). The Royal Collection © 2005, Her Majesty Queen Elizabeth II.

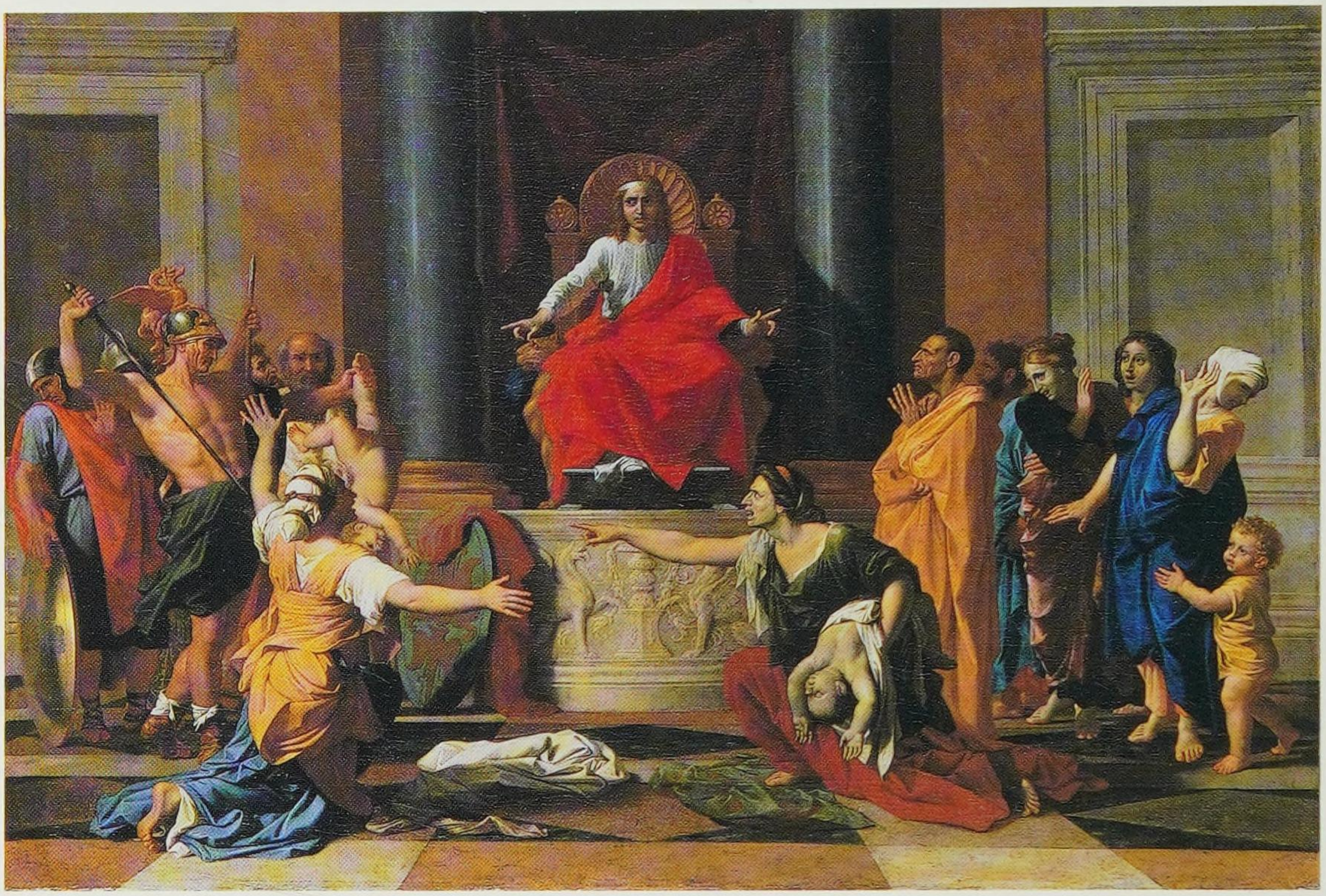

**PLATE 13**. Nicolas Poussin, *Le jugement de Salomon* [*The Judgment of Solomon*], 1649, oil on canvas, 39 ¾ x 59 in. (101 x 150 cm). Musée du Louvre, Paris. Réunion des Musées Nationaux/Art Resource, New York.

**PLATE 14.** Johannes Vermeer, *Woman Holding a Balance,* c. 1664, oil on canvas, 16 ¾ x 15 in. (42.5 x 38 cm). Image © 2005 Board of Trustees, National Gallery of Art, Washington, D.C. Widener Collection.

PLATE 15. Johannes Vermeer, *Woman with a Pearl Necklace,* c. 1664, oil on canvas, 21 ⅝ x 17 ¾ in. (55 x 45 cm). Staatliche Museen, Gemäldegalerie, Berlin. Bildarchiv Preussischer Kulturbesitz/Art Resource, New York.

**PLATE 16**. Johannes Vermeer, *The Girl with a Pearl Earring*, c. 1665, oil on canvas, 18 ¼ x 15 ¾ in. (46.5 x 40 cm). Royal Cabinet of Paintings, Mauritshuis, The Hague.

**PLATE 17.** Johannes Vermeer, *The Procuress,* 1656, oil on canvas, 56 ⅛ x 51 ⅛ in. (143 x 130 cm). Staatliche Kunstsammlungen, Gemäldegalerie, Dresden. Erich Lessing / Art Resource, New York.

camera) and a peephole (aperture) through which light rays penetrate. These rays project onto the far wall of the camera the inverted image of what lies directly outside the peephole; that is, they project what stands or moves beyond the camera onto its far inside wall, opposite the peephole. A mirror can serve to right the projected image. Vermeer's geometrically precise rooms and the impressionistic quality of some of his work have led many critics to conclude that he used a camera obscura. In his *View of Delft,* for example, the small globules on the hulls of the two barges depict not what the naked eye would see but rather the distortions that the camera obscura would produce. I do not attempt to resolve the question of whether Vermeer actually used the camera obscura, a subject of sustained and vigorous debate in the art community (if one is keeping score, the aye's appear to have it).[52] Whether or not he used the camera at some stage in the process of making his painting, or whether instead he witnessed the effects of a camera obscura and incorporated them into his paintings, his art evidences rational deliberation, careful calculations. For this reason I refer to the functioning of the camera obscura to suggest an important link between the Dutch painters and Descartes, the eye and the mind.

Jonathan Crary provides a first link between the camera obscura and Descartes's theory.[53] He emphasizes how "the orderly and calculable penetration of light rays through the single opening of the camera corresponds to the flooding of the mind by the light of reason."[54] Crary invokes Vermeer's *Astronomer* and *Geographer* as illustrations of this process, concluding that "the camera, or room, is the site within which an orderly projection of the world, of extended substance, is made available for inspection by the mind.[55] Exploring how the *res cogitans,* the mind, the thinking subject, comes to know the *res extensa,* the world beyond the window, Crary reminds us that God, although he is absent from the Cogito (evacuated, as it were, from the mind that builds the table of elements), remains a looming presence in Descartes's thinking:

> If at the core of Descartes's method was the need to escape the uncertainties of mere human vision and the confusions of the senses, the camera obscura is congruent with his quest to found human knowledge on a purely objective view of the world. The aperture of the camera obscura corresponds to a single, mathematically definable point, from which the world can be logically deduced by a progressive accumulation and combination of signs. It is a device embodying man's position between God and the world. Founded on laws of nature (optics) but extrapolated to a plane outside of nature, the

> camera obscura provides a vantage point onto the world analogous to the eye of God.[56]

In Crary's formulation the camera obscura mediates between the natural world (the world created by God and imbued with meaning by him) and human understanding (the mind). The aperture of the camera obscura, which serves to project the light in ways that ensure an accurate perspective of the event that takes place outside its walls, represents the channeling of light into the mind. The "flooding of the mind by the light of reason," as Crary terms it, corresponds with the mind's capacity to perform a series of mathematically grounded and therefore, so Descartes's theory goes, verifiable and irrefutable operations that produce an accurate view of the world.

The camera obscura models more than the relation of mind to nature. Man's fascination with the device remains in part due to the fact that it produces an unmediated knowledge, direct contact with experience normally beyond his grasp: the world comes directly to him through the aperture, forming an image that he can see and measure precisely. The camera obscura does not fix a static image onto the panel or paper; rather the image that appears on the far wall continues to move, reflecting the changing effects of light, wind, the motion of things outside it. Historically, people associated this unmediated image with God.[57] Descartes's own thinking happens in God's shadow. The philosopher has an idea of infinity but is not himself infinite; that is, he understands infinity but does not comprehend it, does not encompass it in thought. God is perfection and God is not a deceiver. The philosopher's originary act of self-validation, the Cogito, is completed by his validation of all clear and distinct ideas and, more specifically, by the mathematics that allow him to interpret, or validate, the world.[58] The look inward, inside the camera, is always also a look outward, toward the divine. The camera obscura creates a world, in representation, that in turn allows man to penetrate, one image at time, the mysteries of the universe. Descartes looks into himself, into the camera of his mind, to know the truth about the world.

What is most striking about the camera obscura as it replicates the activity of the eye that transmits light into the mind, therefore, is its consolidation of the visual field into a single projected image inside its walls. What exists outside, in nature, is framed as it penetrates the aperture of the camera, and framed again by the painter who adjusts its position, first in a mirror and then on his paper or canvas, to capture just the effect

he desires. Telescoping the world into an image that is "framed" within the room, the camera obscura models the reproduction of the image projected onto the retina of the eye. Ferdinand Alquié identifies the engraving that accompanies Descartes's *Dioptrique* (fig. 3) as illustrating the actual study Descartes conducted with a camera obscura, producing results that corroborate Kepler's retinal studies:

> Le petit personnage qui, dans la figure, regarde le corps blanc placé au fond d'un œil n'est donc pas la représentation symbolique de notre âme. C'est un personnage réel regardant réellement, dans une chambre noire, un écran blanc placé au fond d'un œil réel prélevé sur un bœuf, ou sur un homme mort.
>
> [The little figure who, in the engraving, looks at the white body placed at the back of the eye is not the symbolic representation of our soul. It is a real person in a darkened room who is really looking at a white screen placed at the back of a real eye removed from an ox, or from a dead man.][59]

Stoichita interprets this engraving as a model of the impossibility of observing oneself seeing: "On a, d'un côté, un 'œil-objet' ('œil mort,' activé par la lumière d'une fenêtre, un œil mort qui fonctionne 'comme s'il était vivant') et, de l'autre côté, un 'œil sujet,' qui contemple la peinture formée sur la rétine du premier" [On one side there is an "eye object" (the "dead eye," which is activated by the light of a window, an eye that functions "as if it were living") and, on the other side, an "eye subject," who contemplates the painting formed on the retina of the first eye].[60] Descartes compensates for the impossibility of direct perception by noting the functioning of the eye as it forms a painting ("peinture") on the back of the eye object. The camera obscura performs the operation that the eye of Descartes who uses it re-performs in miniature.

In the introduction I discussed the multiples "I" 's of the transcendental subject embedded within the narrative authored by the subject Descartes. In its consolidation of the image first on the wall and then in the eye of beholder, the model of the camera obscura adds further layers to this representation of the subject. The application of the technique of *mise en abyme,* the insertion of a representation within a representation, is one that the philosopher shares with Vermeer. The Dutch artist often incorporated framed paintings into his works. The technique was by no means original; the *mise en abyme,* well established in the annals of art from earlier periods, was a device so common in the seventeenth cen-

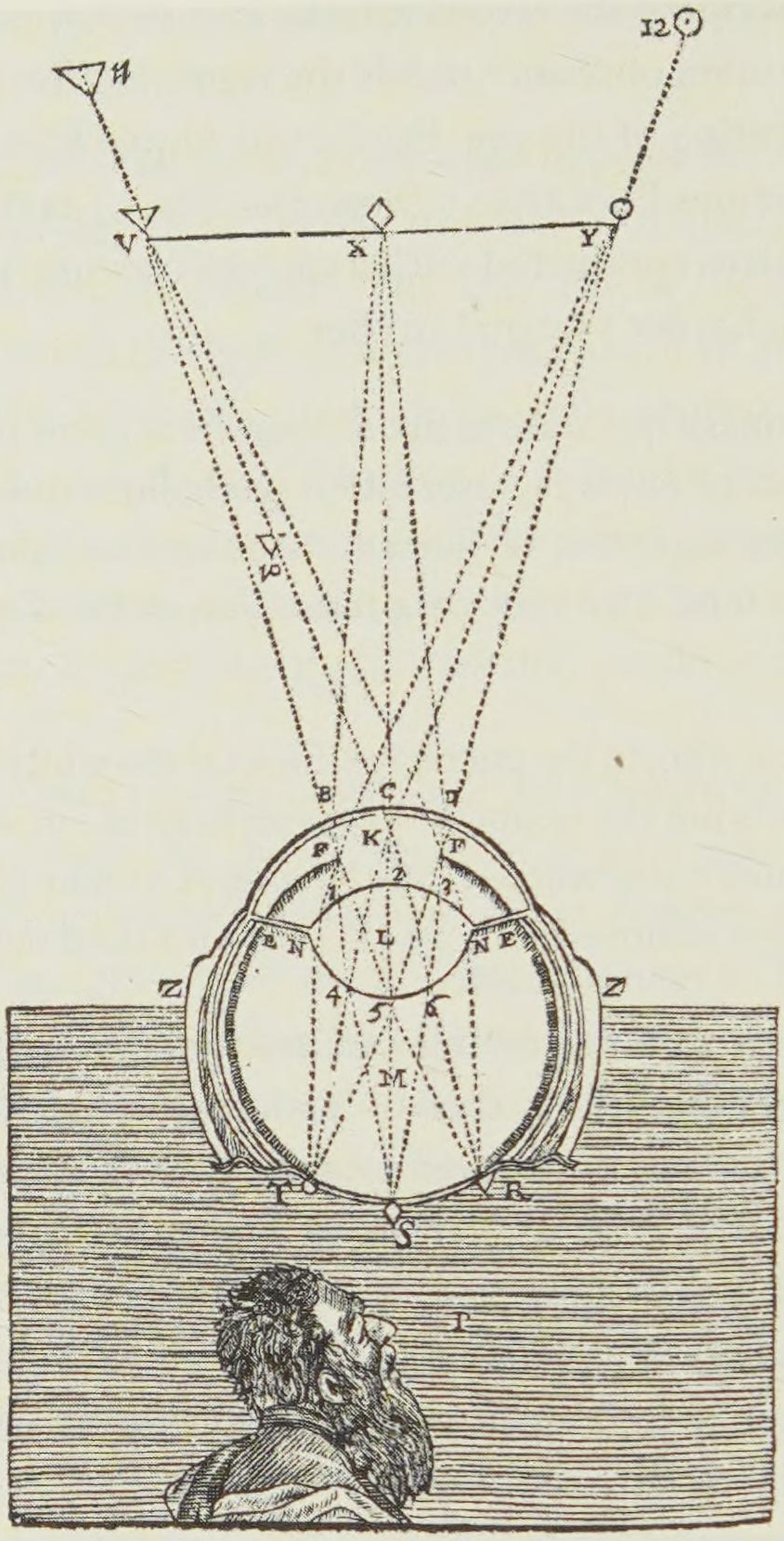


**FIGURE 3.** René Descartes, Eye, *Principia philosophiae* (Amsterdam: Elsevir, 1677). Bernard Becker Medical Library, Washington University School of Medicine, St. Louis.

tury, in fact, as to be almost banal.[61] Its prevalence during this period underscores a focus on formal logic. The *mise en abyme* conveys a very ingrained sense of proportion and, in particular, the deliberate construction of paradigms, both requisites for framing a taxonomy.

In its consolidation of the visual field, the camera obscura offers us a lesson on the classification of objects. The embedded form that appears in the camera obscura, the image, highlights the discrepancy between nature and representation, being and thought, original and copy. So, too, the *mise en abyme,* whether visual or textual, serves as a mirror to the

larger work in which it appears; its function "in miniature" is to call attention to the system ordering the full representation (the larger image; the complete text). How do we know that we know something? We know when we can reproduce it. Reproduction relates to capturing minute details of the original: the scientist or the artist masters the original well enough to isolate all of its elements and to show how each relates to the others.

The *mise en abyme* is not the only system operant in Dutch painting of this period. It is not present in all works; nor does it function as the sole support in works in which it does occur. A painting that includes other paintings may also be structured through contrasts; ascending and descending progressions, patterns that are irregular, and so on. But I contend that the *mise en abyme* and the relation of analogy that it sets in place are central to understanding the epistemological underpinnings of this art. The replicate image reinforces the original. If an artist paints a portrait of himself painting a self-portrait, he, like Descartes thinking in his *poêle,* adds weight to the importance of his subject, indeed of himself as subject, by multiplying the instances in which he appears in his work. If for no reason other than a purely arithmetic progression, two images of a subject painting are more imposing than one. And when the artist serves as both the subject and the object of the representations, both the painter who makes the image and the object he paints, then the mirroring effect serves to strengthen further his position of authority. He resembles the scientist who proves the accuracy of his findings through iteration, repeated experiments. To be valid, the same data must obtain when another scientist performs the identical experiment. Descartes sets up this possibility, but narrates it in such a way as to suggest that ego as much as science is at stake, and that his science requires the art of persuasion to take effect. Inviting other capable men to apply his principles and discover for themselves what he has uncovered, Descartes acknowledges the critical importance of method and also the need to offer a public record of his discovery of it so that others can validate and extend his research. He claims to offer enough for them to be able to follow his example, yet not so much that they can distort or pretend to surpass it. On the one hand, he insists that he offers the fundamental principles necessary for further research:

> Que [Si les meilleurs esprits] préfèrent la connaissance de quelque peu de vérités à la vanité de paraître n'ignorer rien, comme sans doute elle est bien

> préférable, et qu'ils veuillent suivre un dessein semblable au mien, ils n'ont pas besoin, pour cela, que je leur dise rien davantage que ce que j'ai dit en ce discours.
>
> [But if (the best minds) prefer the knowledge of a few truths to the vanity of appearing to know everything, as it is preferable that they do, and if they want to follow a path similar to my own, they need me to say no more than what I have already said in this discourse.] (*Discours*, AT 6:71)

Yet Descartes reserves for himself the starring role in this history. He admits that he has not yet sufficiently developed his ideas; they require further investigation. Still, the philosopher seeks no help from anyone:

> Et je pense pouvoir dire, sans vanité, que, s'il y a quelqu'un qui en soit capable, ce doit être plutôt moi qu'aucun autre: non pas qu'il ne puisse y avoir au monde plusieurs esprits incomparablement meilleurs que le mien; mais parce qu'on ne saurait si bien concevoir une chose et la rendre sienne, lorsqu'on l'apprend de quelque autre, que lorsqu'on l'invente soi-même.
>
> [And I believe that I can say without vanity that if there is someone who is capable of doing this, I should be the one rather than someone else—not because it is inconceivable that several minds incomparably better than my own exist in the world, but rather because one does not know as well how to conceive something and make it one's own when one learns it from someone else as one does when one invents it oneself.] (*Discours*, AT 6:69)

Descartes presents a somewhat circular argument. He needs to discover how to revise and extend his ideas himself . . . because he needs to know how to revise and extend his ideas himself in order to understand them. The needs of science are somewhat elided from the text, unless one considers Descartes's vanity as a kind of posturing, a plea to be let alone to complete his work. With all due modesty, he points the reader back to himself as sole author of the truth.[62] His discourse is a distortion, an apology intended to persuade, and not a simple history. He hopes to calibrate his account of his science so effectively as to serve the truth, but in such a way as to frame his own identity as unique author of his ideas.

Descartes elaborates a principle of representation in *La dioptrique*, employing another comparison with perspective in art to drive home his point. Making the distinction between an exact image, a copy of the object, and signs that allow one to know the object, he notes that a representation cannot completely resemble the thing it reproduces, because there would otherwise be no way to distinguish them: "Il n'y a aucunes

images qui doivent en tout ressembler aux objets qu'elles représentent: car autrement il n'y aurait point de distinction entre l'objet et son image" [No image ever resembles the objects it represents in all respects, for otherwise there would be no difference between the object and its image] (*Dioptrique,* AT 6:113). In another comparison with art, he insists:

> Comme vous voyez que les tailles-douces, n'étant faites que d'un peu d'encre posée ça et là sur du papier, nous représentent des forêts, des villes, des hommes, et même des batailles et des tempêtes, bien que, d'une infinité de diverses qualités qu'elles nous font concevoir en ces objets, il n'y en ait aucune que la figure seule dont elles aient proprement la ressemblance; et encore est-ce une ressemblance fort imparfaite, vu que sur une superficie toute plate, elles nous représentent des corps diversement relevés et enfoncés, et que même suivant les règles de la perspective, souvent elles représentent mieux les cercles par des ovales que par d'autres cercles; et des carrés par des losanges que par d'autres carrés; et ainsi de toutes les autres figures: en sorte que souvent, pour être plus parfaites en qualités d'images, et représenter mieux un objet, elles doivent ne lui pas ressembler.
>
> [You see this with engravings, which, made simply with a little ink placed here and there on a piece of paper, represent forests, cities, men, and even battles and storms to us. Yet of the infinite number of qualities that they allow us to see in these objects, there is not one which bears a complete resemblance to the objects except for the shape, and even the shape offers a very imperfect likeness, given that on a flat surface the engravings show us bodies that have different reliefs and depths, and, even when they respect the rules of perspective, they often represent circles better with ovals than with other circles; and squares with diamonds rather than with other squares; and so forth with all the other shapes. Thus often, in order to be perfect in terms of the image and to represent an object better, they must not resemble this object.] (*Dioptrique,* AT 6:113)

Just as in art one can evoke an entire world with only lines, so too in science one can suggest the truth of an object by revealing only a likeness of it. Seeking to enumerate the "infinite diversity" of the things of the world in ways similar to an artist's renderings of cities and men in battle against the backdrop of nature, its forests and storms, Descartes takes pains to define how thoughts will be able to give shape to the world. In representation the part must sometimes be inexact in order for the whole to appear exact; one must sometimes offer a piece to convey the whole. Pascal would later frame a view of infinity as an argument against

the limits of reason, the possibility of seeing and analyzing the mysteries of nature, of God. We cannot, Pascal argues, perceive the infinitely small any more than the infinitely large. To understand the infinite, he argues, one must abandon all doubts and place one's faith in the Divine. But for Descartes the knowledge of technique, the art of science that allows us to go from smaller to larger, and even from distortion to distortion in representation (if not in judgments) in order to convey the truth, opens the eye, and with it the mind, to a knowledge unparalleled and undeterred by religious doctrine. As the next chapter shows, however, art silently, yet persistently, exposes the limits of Descartes's faith in man's ability to attain an infinite and absolute knowledge. If Descartes's transcendental subject negates from within, that is, if he doubts everything so as to open a new intellectual horizon, that new horizon, Vermeer shows us, is art. In chapter 2 I extend my analysis of the *mise en abyme* as a model for taxonomy by situating the philosopher's representation within the confines of the artist's *camera*.

# 2

# INSET GENESIS

## For a Mind Set / Mindset Out of History

As I noted in the preface, Descartes presents no actual table of knowledge. In the *Discours de la méthode* he comes the closest to doing so in part 5, where he offers a summation of his physics. What intrigues me about this account is less the content of Descartes's science than his choices in structuring a narrative to explain it. Specifically, I investigate whether the allegory that Descartes invokes ultimately compromises his model for discovering the truth. To help explore this phenomenon I turn to Vermeer's *Art of Painting* (plate 4). The route from Descartes to Vermeer covers considerable territory, as it is mediated by Velázquez, and through him by van Eyck. The image of the artist bearing witness to his own creation that van Eyck presented in his 1434 *Arnolfini Portrait* (plate 2) some two hundred years prior to Velázquez's *Meninas* (1656) (plate 3) and *The Art of Painting* (c. 1666–67) remains embedded in our imagination as we evaluate Descartes's representation of his science.

Following Galileo's condemnation by the Inquisition, Descartes decided against publishing his original text, *Le monde ou Traité de lumière* [*The World, or Treatise on Light*], written around 1629. He presents a summary of this text in the *Discours,* where an elaborate fiction creates an effective, though thin, filter for his science:

> Même, pour ombrager un peu toutes ces choses, et pouvoir dire plus librement ce que j'en jugeais, sans être obligé de suivre ni de réfuter les opinions qui sont reçues entre les doctes, je me résolus de laisser tout ce monde ici à leurs disputes et de parler seulement de ce qui arriverait dans un nouveau, si Dieu créait maintenant quelque part, dans les espaces imaginaires, assez de matière pour le composer, et qu'il agitât diversement et sans ordre les diverses parties de cette matière, en sorte qu'il en composât un chaos aussi

confus que les poètes en puissent feindre, et que, par après, il ne fît autre chose que prêter son concours ordinaire à la nature, et la laisser agir suivant les lois qu'il a établies.

[But, in order to keep from bring these matters too much out in the open, and in order to say more freely what I thought about them, without being obliged to follow or to refute the ideas commonly held by scholars, I decided to leave this world to their disputes and to speak only about what would happen in a new world if God were now to create somewhere in the imaginary spaces enough matter to form it; and if he agitated the various parts of this matter in various ways and randomly so that he formed a chaos as confused as any that poets could ever imagine; and that afterwards he had only to offer his customary assistance to nature and let it act according to the laws that he established.] (*Discours*, AT 6:42)

Descartes invents an imaginary other world to demonstrate the physics of the real world. He adopts this tactic because his science is incompatible with the teachings of the Catholic Church, most notably those concerning transubstantiation: one cannot easily use the laws of physics to explain the belief that the Eucharist is literally Christ's body and blood.[1] Descartes structures his argument to protect the integrity of religious doctrine, or, more to the point, to protect the integrity of his argument in the face of religious censorship. He is careful to respect God's authority: he acts not in God's stead but rather as God would act. The distinction proves critical to shielding the philosopher from criticism while at the same time underscoring his own agency. Descartes presumes to understand God's laws and to work in harmony with his design, all the while inventing, ex nihilo, his own planet in order to illustrate theories that run headlong against the teachings of the Church.

In the remainder of this segment of his text, Descartes applies his theory of systematic doubt to the Creation, but only, it appears, to affirm better what God had set in place:

Je fis voir quelles étaient les lois de la nature; et, sans appuyer mes raisons sur aucun autre principe que sur les perfections infinies de Dieu, je tâchai à démontrer toutes celles dont on eût pu avoir quelque doute, et à faire voir qu'elles sont telles, qu'encore que Dieu aurait créé plusieurs mondes, il n'y en saurait avoir aucun où elles manquassent d'être observées.

[I showed what the laws of nature were; and, without basing my reasons on any principle other than that of the infinite perfections of God, I attempted to show all the laws about which one could have had any doubt, and to show

that they are such that, even if God had created several worlds, there would be none in which they failed to be observed.] (*Discours,* AT 6:43–44)

As Descartes defines it, doubt leads to truth only because it assumes the concept of the infinite perfection of God. I will return later to the implications of such an assumption for the truth. Suffice it to say here that in an effort to demonstrate a perfectly ordered nature which he in turn validates through a perfectly logical science, Descartes inaugurates a double premise: the laws of nature are ordered (as opposed to irregular, chaotic); the laws of nature are ordered because one could imagine no other possibility. Descartes reproduces contemporary notions about the infinite perfection of God's world in a clear effort to evade the censors of his new science. The logic that he demonstrates in this introductory presentation, however, assumes the conclusion, order, in the premise, God's will. That is, Descartes presumes rather than proves that there exists a single order to nature consistent with the nature of God himself. Clearly, Descartes's ideas of the physical properties of the universe do result from a series of deductions that he performed, that is, from his own reflections, and independent of divine will. Yet this passage reveals how the philosopher's thinking remains embedded within a particular analytic frame for thought, one that systematically ascribes unity to the universe.

To appreciate the implications of this frame for knowledge, we must recognize how Descartes's description of the imaginary new world functions within the *Discours* as a *mise en abyme*. Descartes's reader cannot fail to see how closely his fabricated world resembles his own. To support his physics, Descartes relies on resemblances. He recounts how, consistent with the laws he mentions, the greatest part of the matter forming the chaos had to be arranged in ways reminsicent of the real universe. Some of these parts had to form an earth, and others planets and comets, and still others a sun and fixed stars. Descartes underscores the properties of light, including how it travels from the sun to the earth:

M'étendant sur le sujet de la lumière, j'expliquai bien au long quelle était celle qui se devait trouver dans le soleil et les étoiles, et comment de là elle traversait en un instant les immenses espaces des cieux, et comment elle se réfléchissait des planètes et des comètes vers la terre.

[As I broached the subject of light, I explained in great detail that which was found in the sun and the stars and how from there it crossed in an instant the immense spaces of the heavens, and how it was reflected off the planets and the comets onto the earth.] (*Discours,* AT 6:43)

Further specifying the substance, position, movements, and all the various qualities of these heavens and these stars, the philosopher ends by asserting an absolute resemblance between real and fictional planets: "En sorte que je pensais en dire assez pour faire connaître qu'il ne se remarque rien en ceux de ce monde, qui ne dût, ou du moins qui ne pût, paraître tout semblable en ceux du monde que je décrivais" [I believed that I had thereby said enough about them to make it clear that there is nothing observable in our world that should not, or at least could not, seem completely similar to those in the world that I was describing] (*Discours,* AT 6:43–44).

Paradoxically, although Descartes championed a major epistemological and cultural shift in releasing science from the model of the analogy between the microcosm (the earth) and the macrocosm (the divine), his presentation of his physics relies on an explicit connection between the two realms. This account of his discoveries does not constitute a throwback to the Renaissance model of the great chain of being. But neither does it advocate a clear step forward, a step toward truth and away from the calculated artifice of representation. Although Descartes promotes a new science, the correspondence that he establishes between the imaginary and the real serves in the end to demonstrate the limits of his model, for it precludes any knowledge radically severed from his role in authoring it.

Whatever the sincerity of his religious convictions, Descartes stipulates an essential connection between the real world and divine perfection, on the one hand, and the world that he invents to explain his physics and a perfectly ordered nature, on the other.[2] God, who is infinite, has imposed the laws of nature; with our thoughts, which are finite, we can understand these laws; God therefore must order our thoughts to occur. Despite his efforts to avoid the problem, the philosopher's narrative nevertheless remains different from that of Genesis. Descartes's argument depends on an analogy associating the properties of his fictive world and those of the earth, and, in a second permutation, his invention of a fictive world with the history of God's Creation. We discover, however, that the link between Descartes's account of the creation of the universe and the Genesis account are not entirely parallel.

Étienne Gilson, in his edition of the *Discours,* notes that Descartes could not present his ideas in a manner wholly consistent with the biblical account and therefore had to resort to inventing his own fable:

Descartes s'est efforcé, dès le début, de rapprocher son exposé du récit de la Genèse; il a toujours pensé que son exposé de la création était le seul conforme à la raison et à la vérité; il a d'abord (1619–1637) jugé impossible d'accorder son exposé avec le détail de la Genèse sans interpréter le texte biblique allégoriquement; puis, vers 1641, il a espéré s'accorder avec la lettre du texte sacré, et, à partir de 1644, il y a définitivement renoncé.

[From the beginning, Descartes took pains to link his presentation with the Genesis account; he always thought that his presentation of the Creation was the only one consistent with both reason and the truth. He first determined (1619–1637) that it was impossible to make his explanation agree with the specifics of the Book of Genesis without interpreting the biblical text allegorically. Then, around 1641, he had hoped to make it correspond with the literal meaning of the sacred text. And after 1644, he finally gave up altogether.][3]

Whereas the biblical account has God create the world in its perfection from the beginning, Descartes describes a progressive evolution. He serves his didactic purpose by "unpacking" the Creation into its composite parts, adding the following disclaimer:

Toutefois, je ne voudrais pas inférer de toutes ces choses, que ce monde ait été créé en la façon que je proposais; car il est bien plus vraisemblable que, dès le commencement, Dieu l'a rendu tel qu'il devait être. Mais il est certain, et c'est une opinion communément reçue entre les théologiens, que l'action, par laquelle maintenant il le conserve, est toute la même que celle par laquelle il l'a créé; de façon qu'encore qu'il ne lui aurait point donné, au commencement, d'autre forme que celle du chaos, pourvu qu'ayant établi les lois de la nature, il lui prêtait son concours, pour agir ainsi qu'elle a de coutume, on peut croire, sans faire tort au miracle de la création, que par cela seul toutes les choses qui sont purement matérielles auraient pu, avec le temps, s'y rendre telles que nous les voyons à présent. Et leur nature est bien plus aisée à concevoir, lorsqu'on les voit naître peu à peu en cette sorte, que lorsqu'on ne les considère que toutes faites.

[Nevertheless, I would not want to infer from all of these things that this world had been created as I was proposing, for it is far more probable that right from the beginning God made it exactly as it should be. But it is certain, and this is an opinion commonly accepted among theologians, that the action through which he now preserves it is identical to that through which he created it. Thus even if in the beginning he would not have given it any form other than that of chaos (provided that, after establishing the laws of

> nature, he had it act as it normally does), we can believe, without impugning the miracle of Creation, that by this alone all purely material things could, over time, become what we now see them to be. And their nature is easier to conceive when we see them come into being in this way than when we consider them only as already formed entities.] (*Discours,* AT 6:45)

Descartes affirms once again that he does not usurp God's role in endeavoring to explain the workings of the world. Nor does he supplant the theologians, who would have God render the world in all its perfection from its inception. Rather, in an interesting rhetorical maneuver, Descartes invokes the teachings of the theologians to say something about God, thereby associating himself with the Church's position, while at the same time reserving for himself a space that is neither God's nor the theologians'. He offers something other, a fable of another world.

Descartes inserts into the concept of chaos an underlying principle of nature that is mechanical, one that is not only perfectly ordered but also synchronized with mathematical precision. He affirms that the world God created contains within it the principle of its own regulation. Undeniably, the largest context for Descartes's fable remains the world created by God. Although he repeatedly acknowledges God's perfection, however, Descartes devotes his attention to demonstrating precisely how nature undergoes continual changes. Yet a perfect order requires no modifications. How does one explain a world as both stable and fluid? Consistently with established beliefs, Descartes asserts that God conserves the world according to the same principles that he used to create it.[4] Descartes maintains that from a limited number of principles concerning the conservation of the world, he can deduce the rest of physics —the series of systematic and immutable laws that regulate the physical universe in all of its movements and transformations. The philosopher's didactic partitioning of the whole of creation into its sequential parts suggests that knowledge develops through a progressive analysis. As in a taxonomic model, one part leads logically to the next.

Within Descartes's fable, the idea of the perfection of the world is not assumed as a precondition, as in Genesis, but rather is made; his world order develops "over time." The precise ordering of events, however, is a matter of concern. Gilson further notes that in the original text of *Le monde,* the distinction between the biblical Creation and Descartes's *fabula* is patent: "Dans la Genèse, Dieu crée la lumière avant les astres (I, 3); dans le *Monde* de Descartes, la lumière n'est que l'action produite sur les yeux de l'homme par le mouvement de la matière dont les astres sont

formés; impossible de concilier les deux récits" [In the Book of Genesis, God creates light before the stars (1:3). In Descartes's *World,* light is only the action produced on man's eyes through the movement of the matter of which the stars are formed; it is impossible to reconcile the two accounts].[5] Moreover, according to the biblical account, God created heaven and earth, the planets, and the animals. In Descartes's version, God created the elements from which heaven, earth, planets, and animals would eventually evolve.[6] The differences are striking. Insisting on the original elements—the matter whose movement created the rest—Descartes diverges from the narrative path of the "official" account to which he refers by isolating a first act. He describes not four elements of a unique Creation but rather a sequence of events that extends from the elements to the heavens and the comets, gravity and the flow of the tides, light and the fire that produces it, and even through the human circulatory system. Despite Descartes's acceptance of the permanence and perfection of the world, he uses cause-and-effect relations to explain a gradual unfolding and parceling of knowledge. Descartes's analysis thus does not cohere entirely with the notion of the natural perfection "already there" and maintained through God's immutable laws.

God's perfection lies behind all that the philosopher uncovers. Yet in showing how the sun was formed, how the stars developed, and so forth, Descartes in fact veers away from the idea of a single act of creation infinitely preserved as presented in the Genesis account. Analyzing the interrelations of observable phenomena, he argues that they follow a consistent pattern: all things in the universe, from the sun to man, function like machines. By conceiving this mechanical principle as an explanation for the order of the cosmos, Descartes manages to focus his attention on the discovery and explanation of particular causes and effects, on successive states rather than on an absolute condition.

Descartes's world in many respects models in miniature the full narrative of the *Discours de la méthode*. He offers a representation of nature based on logical relations, methodically plotting the elements of his imaginary planet like so many entries in a table of elements. Descartes's highly systematic sense is evident in his expressed anti-Aristotelian belief that matter can be measured through the application of geometry.[7] It is highly significant, therefore, that the philosopher's logic separates him from the Book of Genesis and removes him from established theology when he enumerates the various elements of the world. His decision to explain the organization of elements in nature sequentially, one he pur-

ports to make for purely didactic purposes, has the effect of opening up a new science founded on deductive principles.

Although Descartes affirms that all things are dependent on God, his science develops as a function of his mind rather than of God's actions. Descartes reasons that neither he nor an omnipotent deceiver could prove that he does not exist if he thinks that he does, for this thought alone proves the deceiver wrong. Descartes offers proof of God's existence by arguing that while he, Descartes, has an idea of the infinite and the perfect, this idea could not emanate from him alone because he is finite and imperfect. The coherence of these arguments depends on an idea of God. This explicit relation notwithstanding, we see that, albeit in ways that would have been untenable for Descartes because of the force of seventeenth-century religion and politics, his God is also a self-contained element within his own thinking about nature. Whereas religion understands an idea of God that emanates from the divinity, Descartes is evoking an idea of infinite perfection that is valid independent of any religious context, even though, to be sure, he does not make this distinction. If, in the interest of understanding the epistemological relations that Descartes details, we suppress the religious content and focus instead on an *idea* of infinity and perfection, we can appreciate this idea as representing the limit of reason. It indicates the liminal space beyond the method wherein lie the unnamed and the unknown, all that remains inaccessible to the thinking subject. Paradoxically, although Descartes proves and does not merely assume the existence of God, within the epistemology that he constructs, God functions as the placeholder for all meanings outside the frame of his discourse, all that eludes the table of identities. God represents the truth to which man has no access through reason, even though reason posits and affirms its existence.

God creates the world, but we come to know it through the philosopher's careful articulation of causes. Peter Schouls offers a historical perspective: "For Christian philosophers such as Augustine and Aquinas, the ground of all truth and goodness was, ultimately, God. Descartes rejects these external beings as grounds and finds the ground . . . for all systematic (philosophic and scientific) thinking, and hence for all genuinely human action, within the consciousness of each individual thinker."[8] Descartes bases his science on the relation of things to one another in the world that he describes, in his representation. His physics does not depend on God's will except insofar as he believes God to have willed man's discoveries. Interestingly, where the relations between things remain ob-

scure, Descartes fills in ideas consistent with both religious doctrine and what he knows rationally to be true:

> De la description des corps inanimés et des plantes, je passai à celle des animaux et particulièrement à celle des hommes. Mais, parce que je n'en avais pas encore assez de connaissance pour en parler du même style que du reste, *c'est-à-dire en démontrant les effets par les causes, et faisant voir de quelles semences, et en quelle façon, la nature les doit produire,* je me contentai de supposer que Dieu formât le corps d'un homme, entièrement semblable à l'un des nôtres.
>
> [From the description of inanimate bodies and plants, I went on to describe animals and especially men. But since I did not yet have sufficient knowledge to speak of them in the same fashion as the rest, *that is, by demonstrating the effects through an understanding of the causes and by showing from what seeds and in what way nature must produce them,* I contented myself with the supposition that God formed the body of a man entirely similar to our own body.] (*Discours,* AT 6:45–46; my emphasis)

Clearly, God could have formed a very different being for this other planet. In fact, Descartes admits to a significant lacuna here; he cannot know the man inhabiting the imaginary planet, for he recognizes too few causes for his existence. Yet Descartes presumes to understand human beings on earth as inhabiting bodies that function like machines. This assumption builds on his unfaltering faith in systems and in order itself. We see how, rhetorically at least, in this passage he is back where he started, literally, "in the beginning" with the Genesis account of man.

Schouls distinguishes two methods in Descartes's work: (1) the method of exposition, an analysis or division of things into " 'simple entities' which are knowable per se and thus understood intuitively," and (2) the method of discovery that grounds science, which is "systematic knowledge developed through a process [Descartes] calls 'synthesis,' 'composition,' or 'combination.'"[9] Descartes, however, needs a rule that he cannot prove. He assumes a perfect order somewhat tautologically—God would do nothing less than create a world whose functioning he regulates perfectly—to ensure a perfect knowledge. In doing so, of course, Descartes, although he understandably remains within a deeply rooted tradition of Christian thought, proves unable to release himself not so much from the ideas themselves—he has a theory that allows him to initiate knowledge, the Cogito—as from the logic of his own argument: I explain cause and effect . . . except when I must simply assume them. I am

underscoring the tension between an objective truth, product of an irreproachable logic, on the one hand, and a "truth" based on deductions from an unknown first element that is interpreted as a known, on the other. This tension comes to the fore when we consider the status of the fable as a self-contained entity (*mise en abyme*) within the *Discours*. The primary purpose of Descartes's fable is to permit his reader to penetrate the true order of things in nature. Descartes offers a fiction so thinly veiled that the reader cannot help but understand that the actual subject is the planet Earth. Descartes substitutes a fiction for nature but simultaneously announces this secret, the hidden art of his method, so that the reader cannot fail to apply his physics to the real world. If the secret of his art is thus science, as he recognizes, do the laws of analogy not work through the *mise en abyme* (*Le monde* as it functions within the *Discours*) to suggest also that the secret of his science is art?

Descartes explains that he intended to include in his account everything he knew about the nature of material things, but that the decision to publish his findings, the act of writing, required him to select only some of this material (*Discours,* AT 6:42). Descartes does not expect his reader to confuse the selection of elements and the allegorization of elements, the true nature of what he presents and its fictional cover. The problem lies elsewhere. Curiously, Descartes does not fully acknowledge the limits of the fable/allegory he invents.[10] What remains veiled is the fact that all truth is representation. Moreover, all representation proceeds from a point of origin, whether a first image, principle of infinity, or history. Descartes, as author, initiates a representation, a system, that imposes an arbitrary order. Its elements must cohere, and that coherence, that assumption of order, means that one will recognize (see and classify in the table of knowledge) only ordered things. All thinking will occur within that mindset, that analytic frame. Although Descartes readily acknowledges his fictional planet, he does not expose, and apparently does not see, that his articulation of the frame narrative for this fiction inevitably points back to his place outside representation. Within his discourse Descartes not only acts as God would but also becomes the originator of the facts that he discovers. No truth that fails to account for his position, therefore, is complete.

In an incisive reading of Descartes and *The Art of Painting,* Christopher Braider argues that Vermeer exposes a flaw in the Cartesian ego's nature, namely, its tendency "to defeat its own demiurgical pretensions" by revealing its limits when measured against the absolute.[11] Emphasizing

how Descartes and Vermeer both establish the primacy of agency, the philosopher's and the artist's efforts to assert their authority, Braider establishes an opposition between myth, which he associates with a narrative that is omnipresent and fundamental to being, and allegory, which functions as a conceit:

> For myth is essentially authorless, arising from the depths of our collective consciousness of being as a tale from time immemorial, prior to any telling, always there, and always true. Allegory, by contrast, is the product of an artful act of construction, a telling prior to the tale, rooted in the word and will of a specific "speaking subject." . . . The very need for this laborious symbolic striving, the effort to reach the one Reality behind the multiplicitous shadow play of appearances, presumes a fall from ultimate truth: allegory is the measure of its own estrangement from the mythic source it tries to recover.[12]

Distinguishing between the mythic (universal) and the allegorical (particular), Braider develops myth as a timeless, infinite narrative, and allegory as a more time-specific and limited version of experience. One might argue that the Genesis account of Creation functions in part 5 of the *Discours* as the myth that Braider describes. Even though the biblical narrative recounts a moment of origin, Descartes assumes that it is "always there and always true." Yet Descartes's own allegory, his fabled world, transforms this myth, and the truth that it conveys, into another form of allegory, that of a history invented and controlled by man in a failed effort to bring his finite knowledge into accord with the infinite. The problem centers on the way in which Descartes reworks the biblical text, taking the concept of authorship, via God's historic creation of the universe, a step further. Avoiding the question of a conflict with the biblical source, Descartes frames a new history, beginning with references to the essential elements, the matter used to create the new planet: "si Dieu créait maintenant quelque part, dans les espaces imaginaires, assez de matière pour le composer" [if God were now to create somewhere in the imaginary spaces enough matter to compose it] (*Discours,* AT 6:42). Remove the fiction (allegory), and you access the truth, or so it seems: take away the imaginary planet, and you understand the actual physics of the earth. The problem remains that the other side of Descartes's story of the fictional planet, its beginning, is Genesis as he silently alters it. He claims the *myth* of Creation, a narrative so ingrained in seventeenth-century culture as to seem incontrovertible, while actually invoking a second

*allegory* in which matter is a first cause that produces a string of effects. Unlike the fiction of another planet, which Descartes exposes, the fiction about the Genesis account remains occulted and therefore resists erasure. Descartes's world in fact stands suspended between two allegories: that of the Bible, re-authored by Descartes, and that of his fictional planet. Indeed, to reach Descartes's science, we must penetrate the fable from both ends, starting not with Vermeer but with Velázquez's *Meninas*.

## Velázquez

In his now famous analysis at the beginning of *Les mots et les choses,* Foucault describes Velázquez's masterpiece as the "representation of representation," a painting that informs us about the art of painting.[13] Foucault studies the ways in which Velázquez problematizes the relations between the figures present in the painting and those absent from it. A painter, representing Velázquez himself, paints an image that we cannot see. In the foreground the Infanta, Princess Margarita, stands with her entourage. On the walls hang numerous paintings and, most important for the organization of the painting, a mirror in which we see the reflection of King Philip IV and Queen Mariana. We do not see the royal couple, only their likeness. One obvious narrative of this scene has the artist painting the king and queen, which event the young princess has come to watch. The royal couple, in flesh and blood, pose for the artist in the space in front of the painting that the viewer eventually occupies.[14] Why, then, does Velázquez exclude the monarch, his patron, from his painting? Velázquez represents the sovereigns not corporally but as a reflection linked to the image that the painter paints within the painting, replicating Velázquez's own role outside it. Velázquez's double, the royal couple's mirrored image, and the royal entourage there to observe the event all form part of a series of elements in the work that acquire meaning only via the art of painting. Velázquez celebrates art by drawing the viewer's attention to the fabrication, display, and replication of images within the work.

The image of the royal couple framed within the mirror stands out from the other framed images on the wall, which are removed from the light and whose somber forms are more difficult to discern.[15] The secret of the royal couple's place in history as Velázquez records it is that they exist only as representation, only as a product of his spectral play. Foucault comments on the painting's most intriguing aspect, the fact that

the mirror reflects no one in the scene and that no one included in the painting looks at the mirror:

> De toutes les représentations que représente le tableau, [le miroir] est la seule visible; mais nul ne le regarde. Debout à côté de sa toile, et l'attention toute tirée vers son modèle, le peintre ne peut voir cette glace qui brille doucement derrière lui. Les autres personnages du tableau sont pour la plupart tournés eux aussi vers ce qui doit se passer en avant. . . . Il faut reconnaître que cette indifférence n'a d'égale que la sienne [celle du miroir]. Il ne reflète rien, en effet, de ce qui se trouve dans le même espace que lui: ni le peintre qui lui tourne le dos, ni les personnages au centre de la pièce. En sa claire profondeur, ce n'est pas le visible qu'il mire.
>
> [Of all the representations that the painting represents, (the mirror) is the only one visible; but no one is looking at it. Standing next to his canvas, with his attention completely turned toward his model, the painter cannot see this mirror that shines softly behind him. The other figures in the painting are for the most part also turned toward what must be happening in front of it. . . . Significantly, this indifference is matched only by the mirror's own. It reflects nothing, in fact, of the space in which it is located: it shows neither the painter, who has his back turned toward it, nor the figures in the center of the room. It is not the visible that it reflects in its clear depths.][16]

Other scholars have concluded, on the basis of a detailed analysis of the lines of perspective in the painting, that the mirror reflects not the royal couple posing for the painter but rather their painted image on the easel.[17] According to this interpretation, the representation of the couple in the mirror is in fact a representation of a representation: the mirror reflects the image on the canvas, which in turn captures the sovereign couple elided from the painting itself. We can never know for certain what narrative Velázquez intended the viewer to construct from his reverberating images since the question of linear perspective remains unresolved and unresolvable. Jonathan Brown concludes that "the perspective was deliberately left ambiguous in order to accommodate more than one reading of the composition."[18] For Hubert Damisch, as well, the question remains open:

> Les *Ménines* sont-elles construites en perspective? La question semble n'avoir pas de sens, tant la réponse est évidente. Et pourtant les indices sont bien peu nombreux, et surtout peu manifestes, qui permettent de localiser le point de fuite: la ligne oblique qui marque la jonction entre le plafond et le mur de droite, et cette autre, sur le même mur, qui passe par le linteau des

fenêtres, les crochets rivés au plafond pour y suspendre des lustres, etc. Si l'illusion perspective joue cependant à plein, c'est bien plutôt au registre imaginaire, et par l'accumulation des traits que mobilise la représentation, et qui ont tous rapport à l'ordre de la visibilité: le miroir, les regards, les gestes, les tableaux dans le tableau, et jusqu'à ce châssis retourné, disposé obliquement, et qui forme un angle droit avec la porte entrouverte. Le point qu'assigne d'emblée le tableau n'est pas le point géométral, lequel demande à être déduit, ou plutôt inféré, mais un point douteux . . . inassignable, et qui papillote, qui clignote, et se fixe tantôt au droit du regard du peintre, tantôt au droit du miroir, et tantôt (comme le veut la construction perspective) au droit du bras de l'autre Vélasquez, celui-là qui retient le rideau et mime, par métonymie, le dévoilement du tableau qu'il nous découvre.

[Is *Las meninas* ordered through the rules of perspective? The question seems senseless, since the answer is obvious. There are very few indications of this perspective, however, and certainly few that are visible, that is, that allow one to locate the vanishing point: the oblique line marking where the ceiling meets the right wall, and the other on the same wall that goes from the lintel of the windows, the hooks riveted to the ceiling in order to suspend the lights, etc. If the illusion of perspective appears, however, to be completely sustainable, it is more in the imaginary register, and a result of the accumulation of the effects that the representation sets in place, all of which have a connection to the visible: the mirrors, the glances, the gestures, the paintings in the painting, including the easel, turned away from us, situated diagonally in such a way as to form a right angle with the half-opened door. The point that the painting assigns at first is not the geometric point, which requires that we deduce or, rather, infer it, but instead a doubtful point . . . [one] that cannot be assigned, and that flickers, that blinks, and that is established sometimes at right angles with the painter's glance, sometimes at right angles with the mirror, and sometimes (as the perspectival construction of the painting indicates) at right angles with the arm of that other Velázquez, that of the marshal holding the curtain in the doorway who imitates, metonymically, the unveiling of the painting that he is showing us.][19]

Thus, whether Velázquez intended his viewer to complete the calculations necessary for the conclusion that the mirror reflects the image on the canvas, or whether he simply privileged the idea of representation and the play of images that the royal couple's presence in the mirror underscores, he clearly created an ambiguous sign at the center of his work. We question whether the king and queen, the painter's privileged audience, actually exist in the painting in one, two, or three different mani-

festations: in the mirror (a reflection of them standing outside the picture frame); on the canvas as reflected in the mirror; or both in the mirror and also, though invisible to the viewer, as a painted image on the canvas not reflected in the mirror. A fourth possibility, the most unlikely because the most dependent on the illusion of perspective in defiance of actual geometric constraints, would involve a stunning coordination of the mirror image as a reflection of both the canvas and the royal couple as they pose for the painter, simultaneously. By engaging the viewer in an elaborate articulation of the elements in the painting, Velázquez establishes the *mise en abyme* as a frame device that he manipulates with tantalizing effects.

Noting significant compositional echoes with van Eyck's *Arnolfini Portrait,* a work with which Velázquez was certainly familiar, art historians call attention to the treatment of the mirror, the artist's self-inscription, and the married couple in each painting.[20] In *The Arnolfini Portrait,* the reflection of two additional figures in the mirror captures the viewer's attention. Along with van Eyck's actual signature above the mirror frame, the reflected image serves as a source of validation within the painting. The convex surface of the mirror shows two men as they stand before the couple (seen from behind). The two male figures bear witness to the couple's union, a fact that assumes added importance, given that one of the men may be van Eyck himself. The mirror actualizes the portrait as performance: it is responsible for producing the recognition, or gaze, that makes the marriage official. On another level, the mirror produces the viewer's recognition of van Eyck's work as art worthy of contemplation.

Velázquez inscribes himself in *Las meninas* through the figure of the artist painting. His painter sees the viewer, and this gaze, as Foucault and others have elaborated, in turn raises questions about the status of the royal couple outside the room in which the painter in the painting works. Although he creates *Las meninas* as a portrait of and for the royal family, Velázquez displaces the sovereigns in the painting itself. The double portrait of the king and queen occupies a position similar to that of van Eyck's two witnesses, and serves the same validating functions. As in *The Arnolfini Portrait,* the couple's reflection bears witness inside the painting, this time to the artist whose inscription assumes the form of the painting he paints within the painting. Similarly, the real king and queen who will view *Las meninas* in the royal palace honor Velázquez, who has inscribed himself into history via his elaborate *mise en abyme*.

The royal couple whose portrait the viewer sees reflected in the mir-

ror, the subjects who have posed/are posing for the work that Velázquez's painter is painting, are also the subjects of Velázquez's meditation on painting: they are the subjects not of a painting simply but of painting, representation, in general. The power to construct identities and hence to organize knowledge rests not with the sovereign, who from his position outside the painting cannot perceive what is on the canvas, but rather with the painter in the painting. Art empowers the court, including the king, by establishing the context for viewing/knowing it. The painter does not merely render the royal couple's likeness; he sets it in place, and lets the viewer see that he does so. He performs a visual demonstration of the system through which the viewer, and hence posterity, can identify and validate the authority of the court. The framed mirror portrait reverberates with a series of other framed images (including the artist's canvas, paintings on the wall, the doorframe, and the windows) to reinforce the notion of representation as a self-contained and carefully ordered system. The chain of framed images in the painting allows the viewer to see, literally, how the mind works through associations to impose meaning on experience. Although it may respond to a real motivation grounded in history, namely court protocols, as these include the king's prerogative and Velázquez's wish to advance professionally by currying favor with the king, representation responds to its own rules as these are set in place by the artist in the painting who imitates Velázquez.

The figured painter has the distinct advantage of knowing that the many glances connected to an appreciation of the image he creates—those within the painting, those of the sovereign couple who pose/have posed for him and who will contemplate his painting once it is hung in the Alcázar Palace, as well as our own—are in some way responses to his initial gaze at his subject. Brown explains that, unlike Renaissance artists who sought to idealize nature in order to express universal truths about man, nature, and the divine, Velázquez adopts a more natural style "to produce an intense encounter with reality."[21] Velázquez's natural style in turn precludes us from dismissing the illusion that he creates through the cascade of images in the painting as effects of his imagination simply. The viewer of *Las meninas* witnesses the performance through which the artist shows painting, his carefully ordered representation, to be key to interpreting the royal family.

Velázquez's empowering depiction of the artist's role relates in part to his aspirations to be admitted into one of the orders of military knight-

hood and for the promotion to noble rank that such an honor afforded.[22] This history provides a realistic social context for the painting and for explaining the painter's motivations. Critics have interpreted the copy of the Rubens painting, in which Minerva humiliates the mortal Arachne for demonstrating that she could weave better than the goddess, as allowing Velázquez to glorify his art, that is, as a plea for the court to recognize art as a privileged form of expression, and more than as a craft simply.[23] Velázquez's own status at the court clearly stands to benefit from this association. We are tempted to look further, however, and to see in Velázquez's appropriation of Rubens's work not only the Spanish painter's aspirations to imitate and thereby acquire for himself recognition worthy of the Dutch master but also, as Linda Seidel notes, to obscure the line between art and reality "by masking appropriation as imitation."[24] One could further argue that Velázquez appropriates power through the act of fashioning the royal portrait, taking for himself the king's power to assign not only titles of knighthood but also, more generally, meanings to events; he sets the names and categories that ground knowledge itself.

Through multiple layers of *mise en abyme,* images that play off one another to reinforce the idea of art as the painting's own privileged referent, Velázquez's masterpiece encourages us to see how representation assigns value to history. The king and queen reflected in the mirror have more presence and therefore more authority in the painting than do the real king and queen. Unquestionably, there exists a real monarch who wields real power, and whose real court Velázquez depicts. The central image of the young princess, heir to the throne, calls attention to troubling issues of succession, as the monarchy lacks a male heir. It is a fact of courtly life, however, that the king's rule remains inseparable from spectacle, the many ceremonies and images of the sovereign that evoke his power.[25] Velázquez participates in this imaginary, transforming the mortal king and queen into a reflection that captivates and endures in his painted mirror. As he narrates it, Velázquez's history concerns no single event in the king's life other than his entry with Queen Mariana into the room of the palace where the artist now paints.[26] *Las meninas* thus serves less as testimony of the king's life than as a celebration of the king as image, and of the artist as his image maker. The baroque play of images presents more a rebus than a revolution, however. He may appear to upstage his king, but the completed painting stands as an homage, the artist's tribute to his master and patron. Velázquez does not so much cast

a shadow on King Philip as allow him, literally, to glow in the reflected light of the artist's own composition. The artist imposes a perspective, a frame for transforming history into a celebration of monarchic privilege. In this way he manipulates appearances to stage his own essential role in maintaining the spectacle of court life, the *theatrum mundi*.

## Vermeer

I have rehearsed Velázquez's celebration of art as a system of representation that he controls in order to highlight a particular feature of Vermeer's *Art of Painting*. Critics frequently pair these works, as they share a similar subject matter, that of a painter painting, and because both structure identities self-reflexively through the painting motif rather than primarily through mimesis, the recording of things in the world. The glory of Vermeer's painter, like that of Velázquez, moreover, depends on his ability to depict history. The allegory of the Dutch painting informs us that honor comes to the painter who devotes his talents to the celebration of history. The model bedecked as Clio, Greek muse of fame and honor, and thus history, complete with trumpet (fame), laurel wreath (honor), and book (record of fame and glory), identifies the noble goal of the painter's art to be the commemoration of past glories.[27] As the title suggests, however, *The Art of Painting* allegorizes history in order to document the power of art.

The tapestry hung like a curtain on the left, the mask, and the open pamphlet on the table all emphasize Vermeer's staging of a moment, the very dramatic moment during which his painter begins to represent Clio on his canvas.[28] Much like Descartes's imaginary planet, Vermeer's depiction of a painter painting functions as a *mise en abyme* within the work. As in *Las meninas,* here the canvas assumes a central role in the scene. We witness the initial phase of the image taking shape before our eyes. More directly than either Descartes or Velázquez, however, Vermeer develops the essential relation between art, artifice, and the historic record. Descartes lightly seals the physics of the real world in a layer of fiction. Velázquez makes direct references to the Spanish court, offering realistic portraits of the royal family and other prominent figures. Vermeer's realism, by contrast, is purely a matter of style. *The Art of Painting* has no proper historic currency; it celebrates no specific personage or event, relying instead on a purely symbolic representation. It structures knowledge entirely through conventions.

The allegorical elements of the painting reinforce the notion that a painter achieves glory by devoting himself to the noble subject of history. Nevertheless, the series of painterly images that pattern the work—Vermeer's painter and double captured as he paints a painting—indicates that the submission of the artist to the ambitions of history remains peripheral. Vermeer demonstrates the structuring of representation itself, as this activity implies not only the skills of the artist able to depict convincingly, as if they were real, the objects that he paints, but also the modeling process, the association of elements in the mind, by which ideas take hold. Through a reliance on models, notably the woman posing for the painter and the painterly *mises en abyme,* Vermeer details the process whereby the artist composes a largely self-referential history.

Consider first the map of the United Netherlands hanging prominently in the room.[29] Along with an array of other objects, this map supports the allegory of *The Art of Painting*. Bordered on four sides, the map recalls Velázquez's framed mirror. The map represents history, but it also informs us about how the painting orders knowledge. Just as a map of this period plots out the geographic and cultural terrain, so Vermeer carefully distributes the various elements of composition related to the artist's work, informing us that this is a painting about painting.[30] The lines of vignettes that constitute the left and right borders of the map contain topographical views of Dutch cities, northern ones on the left and southern ones on the right. Each requires the concentrated attention of the viewer. One cannot take in (although one can see) both the inserted views of the cities and the full map at the same time.[31] The viewer must move vignette by vignette, element by element, to connect and make sense of them, just as the painter does when he composes his image. The map that foregrounds, from its place in the background, a mapping of the painting further suggests the dynamics of Vermeer's work, the shift in perspective that he sets in motion. Linear perspective, the science of plotting objects on a two-dimensional space, ensures that we, via Ripa's *Iconologia,* recognize the laurel wreath, trumpet, and book (by Thucydides) that identify Clio as history's muse.[32] Yet what one might term the *art* of perspective shifts our attention away from the attributes of history and toward the very deliberate ways in which the painting identifies the production of art as the history worthy of staging.

Vermeer denies the viewer full access to the painter, whose back is toward us, and whose body conceals much of his canvas. With these partial views Vermeer entices us to enter the painting. We proceed with caution,

however, looking past the curtain which, like the one that Velázquez's marshal holds back in the doorway, marks an ambiguous passage between exterior and interior spaces. We wonder whether the marshal is preparing to enter or to leave the scene. To decline to enter the painter's studio is to deny oneself access to knowledge, yet to enter is to submit to the system that rules there, to assume the identity that the painter assigns. The marshal embodies the tension of this passage from a real outside of representation to Velázquez's expansive conceit within it. Vermeer, however, offers no rear escape out of the painting. Indeed, the only passage out is the same passage in, the space in front of the painting where Vermeer stood to create it and where the viewer now stands. Thus, although history, in the form of Clio, remains the painter's subject, this history is subject not only to the internal painter's gaze but also to his gaze as it in turn doubles Vermeer's and our own as we view the painting.

Vermeer telescopes the viewer's gaze through the frame of his full work to the image of the painter and his easel, a space onto which other objects in the room will be inscribed. Yet the painting within the painting offers no final image; only Clio's wreath appears on the canvas, a sign of glory in its still nascent form. Vermeer emphasizes a moment of composition—Clio as muse, not Clio as a fixed monument to history. Within this larger representation, that of a work in progress, the allegorical symbols function as props that allow Vermeer via his painted double to demonstrate the symbiosis between history and painting. The painting also highlights the need for an *auctor* who sets the objects in place, who determines the order of the composition that guides our interpretation of them. The point is not merely that the world of representation is distinct from the real, but rather that the created world coheres because of the consistency of the system that the artist conceives to interpret it. Props disappear, and in their place we have signs, objects that convey knowledge to us because they have assumed an identity in relation to the other objects in the painting, so many elements within the taxonomy that the mind's eye constructs.

For all that it fixes, for all the objects that it identifies, however, Vermeer's painting also underscores a process of elaboration that is a deliberate layering of meanings upon meanings. A tension exists between the multiple *mises en abyme* in the painting, on the one hand, and the objects strewn on the table, on the other. The former validate art by concentrating different elements of the work within a single paradigm of painting,

while the latter suggest a class of things that are more elusive. The mask both reveals and conceals, identifying a person as a player on stage, all the while hiding his true identity. Within a drama, moreover, the mask may serve both to identify the character wearing it and to hide his identity from other characters. Similarly, fabric embellishes or otherwise alters an object or person. The open pamphlet on the table that no one reads conveys the unfinished quality of a history, though written, that somehow fails to make its mark.[33] Do these objects that assign no fixed values constitute a still life, another work within the work, through which Vermeer balances the image that the painter is creating? Do they, by virtue of their physical proximity to one another and the fact that they complete the depiction of the arts (painting, music, drama, writing), effectively offset the image of the painter painting a painting within the painting? Or do they instead imply a certain dispersion, a certain randomness? Emphasizing that these objects represent choices for the artist, Braider underscores the arbitrariness of the history emerging on the canvas:

> On the table to the left between Clio and the curtain, as if discarded at some earlier stage of composition, a plaster mask suggesting that the painter has toyed with the idea of identifying his craft not with Clio, muse of history, but with mere Imitation, as a mimetic rather than a historical art. . . . [A]ttesting an alternative version of the nature of his art present to the painter's mind even as he claims the patronage of the historical muse, the mask points to the *choice* he has made. The muse proves thus doubly dependent on the artist: depicted not in her own right, but in the context of the actual work of painting, and with the evidence in the mask of the artist's deliberations as to how to portray her, the muse turns out to be no muse at all, but simply an artist's model, expressing the painter's freely poetic act of making her what he chooses.[34]

Its symmetries and correspondences notwithstanding, the painting emphasizes less a final choice than a progression. Vermeer takes the viewer from the dark elements in the foreground to the room's sunlit background. Standing before the map, Clio is suffused in the light of a window which the half-open curtain at the front of the room conceals. With the natural source of light thus hidden, the image's other light, that of the mind of the painter, makes its presence felt. The elegantly dressed artist whom we see actively using his imagination to judge the scene, who has made the critical selection of accouterments for his model, becomes the inspiration for the work.

Defining Vermeer's realism as a *cosa mentale,* a world captured in representation, Daniel Arasse evokes Poussin's opposition between *aspect* and *prospect*. *Aspect* refers to what the eye registers; *prospect* is a product of reason, of knowing how to represent things to suggest what the eye records:

> Il faut savoir qu'il y a deux manières de voir les objets, l'une en les voyant simplement, et l'autre en les considérant avec attention. Voir simplement n'est autre chose que recevoir naturellement dans l'œil la forme et la ressemblance de la chose vue. Mais voir un objet en le considérant, c'est qu'outre la simple et naturelle perception de la forme [dans] l'œil, l'on cherche avec une application particulière le moyen de bien connaître ce même objet: ainsi on peut dire que le simple aspect est une opération naturelle, et que ce que je nomme le Prospect est un office de raison.
>
> [One must recognize that there are two ways to see objects: one by just seeing them, and the other by considering them attentively. To see alone means nothing but the natural reception in the eye of the shape and resemblance of the thing seen. To see an object attentively, however, involves more than the simple and natural perception in the eye of the shape of the object. One looks with particular attention for the way to really know this object. Thus one could say that the *aspect* alone is a natural operation, whereas what I call the *prospect* is a function of reason.][35]

Poussin reflects a Cartesian emphasis on the faculty of judgment. He supports the belief that understanding requires the intervention of the mind and not simply the ability of the eye to record what it sees. In an astute formulation, Arasse posits that Vermeer in this painting makes the *aspect*—the recording of the visible—his *prospect*—his theory. That is, Arasse inverts the traditional categories to theorize the visual in Vermeer's work; the visual does not exist independently of the mental operation that conceives it as representation.

Although he rejects arguments that recognize Vermeer's genius solely in his ability to convey objects visually, Arasse insists on a kind of visual opacity. The visual becomes its own referent; analysis serves to acknowledge vision as the alpha and omega of knowledge, rather than to afford insight into the particular knowledge the painting orders. Elsewhere Arasse clarifies this relation, stressing the elusive quality of Vermeer's most realistic but also most suggestive images: "In this 'new painting,' to borrow from Poussin, the 'prospect' of the painter, his 'office of reason,' must be to depict the 'aspect' of the objects such as when light makes

them visible, a light which, while making these objects visible, prevents us from 'thoroughly knowing' them—in contrast to Poussin's very intention."[36] In other words, what Vermeer makes us see is identical to what he makes us understand, but what we understand is that we cannot know the objects we see. I have suggested that Vermeer, like many of his contemporaries, does leave meaning suspended. It would be wrong, however, to equate the appreciation of ambivalences with failed knowledge.

Interestingly, though he cites her elsewhere, Arasse does not mention Alpers when referring to Poussin, although she similarly invokes his thesis to explain the visual quality in Dutch art of this period. Alpers provides a fuller citation from Poussin, adding the final sentence, which defines *prospect* as "un office de raison qui dépend de trois choses, sçavoir de l'œil, du rayon visuel, et de la distance de l'œil à l'objet" [a function of reason that depends on three things, that is, the eye, the light ray, and the distance from the eye to the object].[37] By "prospect," Poussin refers specifically to perspectival theory. To introduce the important issue of perspective into the discussion, however, is to create another conundrum. The geometry of Vermeer's painting points us to Clio. She basks in the light from the window; the viewer is posed immediately in front of her; the painter, whose back is to us, turns his gaze toward her; and the viewpoint is just below her right hand.[38] Moreover, the bar and lower border of the map, the alignment of the easel, and the diagonals on the floor all lead to the model.[39] Yet the resounding logic of the painting, its most comprehensive form, as we have seen, is not this geometry but rather that of the *mise en abyme,* the painting under way within the painting about the art of painting. Contemplating Vermeer as he creates the artist who contemplates Clio, we move, in effect, from framed image to framed image: from the artist's studio, to his canvas, to the map with its vignettes of the major cities of the Netherlands hanging on the rear wall of the room.

We need to bear this juxtaposition, the competing systems of line and frame, in mind as we consider the figure of the painter, who looks at the model and also, simultaneously, paints. Arasse argues that his gesture is physically impossible and defies logic:

> Le visage du peintre semble légèrement tourné vers le modèle mais le pinceau a l'air, en même temps, posé sur la toile en cours. Or une telle simultanéité est inconcevable: aucun peintre qui "représente" ne peut, en même temps, peindre et regarder son modèle, "voir et donner à voir."

> [The painter's face seems slightly turned toward the model, but his brush seems at the same time to be resting on the canvas he is painting. Such simultaneity, however, is impossible to imagine: no painter who "represents" can at the same time paint and look at his model, both "see and make visible."][40]

A practical and probable explanation for the painter's gesture does exist, however. One can easily imagine that the artist first positions his hand on the maulstick and then, as he applies the paintbrush to the canvas, looks back at the model to verify that what he remembers concords with what he actually saw. The time separating the painter's initial observation of the model from his subsequent glances back at her as he paints, like the spatial difference separating his view of Clio from the image of her that he begins to form, suggests that knowledge involves a reprise of evidence, an analysis that extends beyond the simple act of observing what is there. To know is always to remember, to interpret, to visualize as a form of conceptualization, and not simply to see.

The Dutch conceived art to be more than a recording of what exists. The painted image depends on an intellectual engagement, on the ordering and measuring that constitutes an act of interpretation. Referring to Vermeer's contemporary, the artist and man of letters Samuel van Hoogstraten, Jørgen Wadum argues that the artist "regarded a work painted *uit den geest* [from the mind] as an image representing an imitation of natural things, but the arrangement and order of those things proceeds from the memory of the artist. He holds the parts of what he resolves to paint in his imagination in disorder until he puts them together in such a way that they form a whole picture."[41] This theory helps us to understand how Dutch artists' compositions resemble a table of knowledge. Not nature but rather the "whole picture" which they assemble piece by piece assigns values to the things of their world. Hoogstraten believed that the artist should "fool the eye, to make the viewer believe that the image is an entirely different reality."[42]

Although he does not employ the trompe l'oeil favored by Hoogstraten, who specialized in illusionistic techniques, Vermeer, as I have noted, marks the process of intellection through shifts in perspective from foreground to background, light to dark. As a result, the painter's hand, not Clio, serves as a focal point for the painting. Vermeer emphasizes the modeling process, the actual conception of the work of art. Its striking light and dark tones and its blurred contours, effects typically as-

sociated with the camera obscura, make the hand a transparent sign of painterly technique.[43] The self-determining gesture through which this hand transfers the brush to the canvas further defines the metamorphosis of the real object into art. We appreciate the technical finesse of the hand; we come to know the worth of the hand's gesture as it reproduces Clio's laurel wreath. This act assigns meaning to all the other elements in the composition. Focusing our attention not on the real model but on the painted copy of Clio, still a fragment of the painter's composition, Vermeer frees *The Art of Painting* from all mimetic constraints except the need to effect a realistic setting, albeit one that, as the model figuring Clio affirms, is dressed transparently for the stage.[44]

In *The Art of Painting* the *mise en abyme* establishes a frame that restricts the flow of identities: objects signify in relation to the concept of painting. Most significantly, *The Art of Painting* displays—that is, both describes and models—how outside of art, outside of what it reveals, things remain obscure and, like the figure of the painter, anonymous, without a name, without an identity. All that exists outside the context of painting in Vermeer's work stays unclassified, secret. With his back turned to us, the painter at his easel is forever unknowable except through his art. But art triumphs here. Hand raised, suspended in contemplation, Vermeer's painter captures himself painting, living the moment of his and Vermeer's own self-realization. The painter we see does not see himself painting, of course, but neither does he simply paint, that is, mechanically transfer to the canvas what stands before him. The element of memory serves as an indicator of a certain cogitation about his subject. He ponders how to represent his muse and, through her, his place in history. Vermeer assigns not the anonymous painter but rather his profession an honored place in history because, as the multiple images of painting demonstrate, the painter's history is that of making official history. Like Clio, Vermeer's evocation of history is "dressed" to elicit the proper admiration. It presents but does not interrogate specific and more complex interpretations of the past. The map behind Clio shows the still united provinces of the Netherlands. In Vermeer's time the Netherlands was divided into the Dutch Republic in the north and the southern provinces still under Spanish rule. The south was increasingly vulnerable to French attacks as Louis XIV sought to take advantage of Spain's declining power in the region. In 1667, the year by which Vermeer likely completed *The Art of Painting,* France's threat to the Republic was severe.[45] Capturing the

moment when the laurel wreath on the painter's canvas begins to designate his tribute to history, Vermeer suggests that this moment frozen in time records the subjection of historic divisions to the harmonizing effects of an art conceived to mask them.

## The Art of Representation

Neither Velázquez nor Vermeer, of course, required Descartes's science to create his masterpiece. It is significant, nonetheless, that both painters' works followed the publication of the *Discours*. Like Velázquez and Vermeer, who, through the figure of the painter, replicate their own role as artist within the image they create, Descartes, when he allegorizes the Creation myth and again when he inserts his fable about the world within the *Discours,* folds himself into and frames himself within his text. Locating truth in the mind of the individual, in one's ability to reason, and not in any external force, including God, Descartes introduces a new subject to whom the painters also pay tribute in demonstrating both the visual and the analytic components of art. Velázquez and Vermeer, moreover, afford us a strategy for interpreting Descartes. To understand his science properly, we need to see how his fable about a planet fits within the full *Discours,* how the latter binds his physics within a frame narrative. Vermeer extends Velázquez's demonstration of the principle of representation—the idea that all knowledge is formed within representation—to the notion that all representation is artifice. Whatever liberties he takes, Velázquez depends on actual history: a real court, with a real king and queen, princess, and other figures whom contemporaries could readily identify. The imaginary that Velázquez explores forms part of court history as he lived it; the Spanish monarchy cultivated an image of its own power through royal commissions, ceremonies, and rhetoric as well as through its conquests. Vermeer, by contrast, invokes history as a symbolic representation, a process of codification, more exclusively. The theater of a model posing for the artist takes precedence over any battles actually fought in cities commemorated on the map, which serves as background for the larger drama of the history of painting taking shape within the painting. Descartes's imaginary world functions like Vermeer's mask and costume, the objects through which the painter in the painting successfully evokes art not only as ennobled through the history it records but also, independently, as a subject worthy of history. Once we remove the mask to expose the fiction in these works, we recognize

that all representation is subject to arbitrary limits, framed by the author/painter. The knowledge that Descartes presents in the space between the two allegories—Genesis and his imaginary world—is bound by his method, by what he can observe and classify. Other data are excluded, still unknown. Descartes, moreover, stands outside his *World,* just as Velázquez and Vermeer stand outside the space of their paintings in which figures of painters stand in for them. The allegories serve to remind us of the invisible hands of narration, the autobiographical "I" who, in shaping the table of elements, captures a certain view of nature but, inevitably, excludes other views that it cannot observe or explain.

God and the idea of perfection exist for Descartes *hors camera,* in his representation of his thought, outside the room and outside his mind and the idea in which he conceives himself, the Cogito, as it determines the truth about him as a subject. Velázquez demonstrates that the frame, the system applied to representation, is an arbitrary starting point. Setting this frame in place, art inaugurates its own history as a method for interpreting history, for shedding a final light on experience. Vermeer further indicates that because we see, literally, the artist fashion his work, we know its limits; we know, if not all that lies outside it, at least that there is an "outside it" where the model wears no costume. It would be an exaggeration to say that whereas Velázquez refers to a king fully dressed, fully crowned, outside the painting Vermeer hints at an "emperor with no clothes," a history that exists as pure illusion or pure fiction. Velázquez shows that knowledge is experience processed through representation. Referring to history only indirectly, Vermeer informs a view that is a total construct, a view that coheres because he releases it, with his curtain, from the Cartesian search for truth, the real world outside the painting. Vermeer's decision to communicate through allegory rather than imitation shows that he clearly delineates the contours of his representation. He allows us to perceive the limits of Descartes's position. Descartes can perfect his method to the point where his proofs are perfectly consistent. He argues that the act of self-validation, the Cogito, logically connects to his validation of the natural world. Separating out the moment of origin with the Cogito, Descartes, however, is destined to experience forever the divide between representation and nature, probability and the truth he seeks. He orders a world incommensurate with God's, incommensurate because his own representation locks him within a finite experience, bounded by his "I" just as Vermeer's painting is framed by the experience of painting. The ineluctable divide between

Descartes's fable and the real world, which he can understand only by allegorizing it, survives all of his proofs to the contrary.

Glorious in its patterns, but ultimately a fabrication, a construct, Descartes's science, as representation, a fable of another world, is as uncertain as it is unreal, framed in the camera of his mind. Scientists, of course, presume that they can apply the knowledge produced in representation directly to nature. They consider representation to be a window onto the world. But the fact that there is no system prior to representation, no logic into which the objects studied insert themselves (for the logic belongs to man and not to nature), implies that the radical gap between representation and the real world cannot be breached except by an act of projection: the scientist must project the knowledge he has produced, this probability, onto nature, which remains both more extensive and more certain, and therefore infinitely beyond his grasp. What Descartes veils through his fable is not so much the relation of fiction to reality, a relation whose secret he intends his reader to penetrate, but rather the fact that in constructing his mechanical system in words, as representation, he substitutes a new allegory for the truth.

The point is not that Descartes fails to advance the cause of science, or that art triumphs over science. Setting the table of identities with mathematical precision but also with artistry, Descartes remains tied to the imaginary that he must cast off in order to enter the truth. The mutually binding relation of art and science is the allegory of record for Descartes, Velázquez, and Vermeer, a record of the fashioning of knowledge, and also of the limits of that process. Descartes in rivaling God, Velázquez in rivaling his king, and Vermeer in rivaling history all vie for a stake in the power that knowledge affords. So, too, as we reckon with their accomplishments, we compose a world within the frame of our own making, better to know and better to control what was, what is, and what will be. To know this fiction is to know the secret of our representation as self-regulating and self-limiting, even as the components of this body of knowledge increase steadily as it extends itself over time.

# PERMUTATIONS

## Science in Art's Mirror

In part 3 of the *Discours de la méthode,* Descartes presents his provisional morality, the moral code that he adopts to guide his actions. The philosopher describes how, during the period of time before he established his method, which alone would guarantee the truth, he felt it incumbent upon him to adopt a certain ethical stance and what today we would call a cultural identity in order to complete his work. The provisional morality thus constitutes a set of principles that Descartes maintained to facilitate his thinking. He offers an intriguing account of this experience, all the more so because he easily could have omitted it. He provides a concise overview of his method in part 2. In part 4 he presents the Cogito, the first element of what I call the table of knowledge. The provisional morality adds narrative continuity, explaining how Descartes proceeded from his initial rejection of extant models to his elaboration of the method. The method itself, however, does not prescribe that one adopt a provisional morality. It promises truth. Descartes refers not only to physics and metaphysics but also to conduct as it encompasses a class of behaviors related to customs, ethics, and values. By the time Descartes writes about his provisional morality in the *Discours,* he has finalized the method; in theory, at least, he has access to the truth. The question becomes one of determining whether he in fact records his findings in such a way as to affirm their validity. Beyond testifying to his experience with the provisional morality—what it was and that he did in fact adopt it—does Descartes model in part 3 of the *Discours* a narrative, or frame structure, for data that is consistent with his goal of assembling a unified knowledge?

During the period in which he adopts the provisional morality, Descartes eschews a life of anarchy, absent any guiding principles. Nor does he wish to marginalize himself from society. His dedication to science, to discovering the order of nature, and his desire to promote his ideas requires instead his rigorous involvement in all activities. With the provisional morality Descartes ensures an intellectual regimen for himself. The provisional morality also represents his first attempts at reasoning after deciding to abandon what he has learned and to start anew. Although he predicted that what he would determine during the period in which the provisional morality applied would need to be revised once he had established the method and had learned the value of systematic doubt for his analysis, his assessments of his thinking during the pre-method interval are revealing. Specifically, Descartes's narrative of his ruminations during this period models to us, though not to him, that even if his logic were to prove irrefutable and if the data he obtained through it were to be entirely accurate, the translation of his findings into a permanent record, a final table of elements, would be fraught with difficulties.

In the first paragraph Descartes announces "three or four maxims." Although he endeavors to be as specific as possible, his "or" renders the text imprecise: "Je me formai une morale par provision, qui ne consistait qu'en trois ou quatre maximes" [I formed a provisional moral code for myself which consisted only of three or four maxims] (*Discours*, AT 6:22). To ensure his goal of self-education, Descartes in fact offers three numbered maxims and a final precept, which functions like a fourth maxim. He specifies that he will: (1) obey the laws and customs of his country; (2) be as firm and decisive in his actions as he can, determined to follow even the most doubtful opinions he adopts with the same dedication as if they were certain; (3) govern himself rather than be governed by fortune, and adapt to the world rather than attempt to adapt the world to him; and (4) review all men's occupations in order to try to choose the best one. I will return later on to some of the implications of these principles. Suffice it to say at the outset that Descartes's classification in this instance remains obscure, even as he carefully outlines for the reader the kinds of behaviors and attitudes that he adopts as his provisional morality. Descartes is not simply sloppy in his presentation. Rather his writing evidences problems that occur when one attempts to situate individual identities within a series of paradigms (laws, customs, will, actions), that is, problems inherent in taxonomy.

In the preface I introduced the idea that in specifying the rules of the method, Descartes moves not only toward a science for knowing the natural world but also toward a science of classification. He commits to four principles: (1) never to accept anything as true that he does not absolutely know to be true; (2) to divide each problem that he examines into as many parts as possible and as required in order to solve them better; (3) to conduct his thoughts in an orderly fashion, beginning with the simplest and most easily identifiable objects, in order to move, little by little, one step at a time, up through the most complex thoughts; and (4) to omit nothing (*Discours*, AT 6:18–19). The first precept resembles mathematical intuition. He rejects the acceptance of givens, whether experienced through tradition or the senses; only clear and distinct ideas are true. The second rule specifies that one must solve or analyze problems by dividing them into as many parts as needed. As in geometry, he advocates determining an unknown entity by comparing it with a known entity. The third rule instructs the scientist to build from individual parts to an integral whole. It relates to the analytic principles for resolving equations, either through reduction by degrees from the simplest item to the most complex or the reverse. The fourth rule states that the scientist must include all relevant data in the analysis; one must invoke all conditions necessary for the solution to the problem.

In practical terms, these rules prescribe that the philosopher will apply the method to a series of objects or phenomena by rejecting received ideas and the merely probable; by dividing the object or the problem into its component parts; by systematically ordering and measuring what he studies; and by being careful to omit nothing from his observations and calculations. These rules are crisp; we see none of the vagueness evident in Descartes's introduction to the provisional morality. More significant is the fact that, although Descartes does not make this claim, these same four rules would necessarily underlie any taxonomic system, any representation that he would offer to explain the results obtained through the application of his method. I am suggesting that it is precisely as a system of representation that the (extended) method—method as it orders discourse (his written account of his discoveries)—encounters limitations.

In what I am terming a second application of the method, Descartes describes his results to his reader; he classifies, orders into a narrative, the data that he has collected. This narrative functions as a taxonomic table into which he filters the diverse elements that he uncovers, but as they are reconceived in a language that allows him to make them avail-

able to his reader. In simple terms, this process refers to the translation, where appropriate, of numerical data into words. But language here refers more generally to the logic of discourse, the possibilities for structuring thoughts, as Foucault has analyzed it in reference to the classical episteme.[1] Specifically, it refers to the partitioning of ideas into distinct categories through what Descartes in his enumeration of the method describes as the ordering and measuring of elements. More precisely, at the record stage, I refer to the need to translate the scientist's initial deductive reasoning into words on the page that respect the integrity of the original analysis. The relationship between experiment and discovery, on the one hand, and the recording of data, on the other, should be simple, consistent with the application of a unique form of reasoning. We find, however, that the relationship between the theory, the experiment, and the final record proves far more vexing.

Steven Shapin and Simon Schaffer argue that in the seventeenth century, knowledge emerged less from discovery—the application of a certain number of procedures to a certain number of objects to elicit a certain number of (objective) results—than from consensus within the scientific community that a given set of results constituted facts. Science, they explain, required not that everyone actually witness events, but rather that the narratives through which experiments were related to the community conform to accepted standards for authenticity. Provided that these standards were maintained, the community could and would agree that the results were legitimate. Shapin and Schaffer therefore conclude that knowledge was produced through conventions for determining the truth and did not reflect a given relation between theory and the world.[2]

In the *Discours de la méthode* Descartes addresses the scientific community. He seeks approval, presenting his case in such a way as to persuade his reader of the validity of his theory for uncovering the truth about the world. His narrative invites his reader to bear witness to his thinking, to follow his logic as he demonstrates through specific examples the connection between theory and practice. What muddies the waters, though, is a certain redundancy, a need to conceive the experiment from the results. Catherine Wilson clarifies the problem: "As Socrates pointed out, you cannot know what the truth is before you have got it and recognized it as truth. How then can you, in Baconian or Cartesian fashion, devise a method for arriving at truth before you have identified

the class of true statements that your method has as its goal? If you have some independent, premethodical means for arriving at a knowledge of what is true, then your method is redundant."[3] I have already indicated evidence of this redundancy in the previous chapter in relation to Descartes's assumption of a principle of order to justify a principle of order. I turn now to his account of his provisional morality to explore further the relation of method and narrative in his search for truth. I argue that, to the degree to which it guides not only experiment but also the record, the method implies a potential for manufacturing rather than discovering truth.

Descartes understands that recording ideas is a difficult operation, one that may produce a transformation such that the positive results initially obtained by the method prove false: "Souvent les choses qui m'ont semblé vraies lorsque j'ai commencé à les concevoir, m'ont paru fausses lorsque je les ai voulu mettre sur le papier" [Often things that seemed true to me when I began to conceive them later seemed false when I went to put them down on paper] (*Discours,* AT 6:66). In this chapter I analyze one paradigm, that of customs, as an example of a disturbing "slippage" that occurs within Descartes's account. Descartes initially rejects the validity of customs for his research but then proceeds to ground his program in a particular set of customs. More significantly, the criteria that he evokes to classify his experiences—us and them, self and other—shift as well. Such inconsistencies reveal inherent weaknesses in his ability to order information efficiently; his discursive logic does not appear capable of conveying the truth. The table of elements that he builds is not, analytically speaking, solid.

Part 3 functions as another mirror text within the *Discours de la méthode.* Again, the key to understanding these relations is the *mise en abyme,* the embedded model that reflects the functioning of the frame, or system, ordering the work. Comparing Descartes's examples with series of paintings by Vermeer that include inserted paintings, I explore ways in which Vermeer shows, literally, the limits of Descartes's representation. Vermeer's works offer "ocular proof," visual demonstrations of the difficulties that arise when one constructs a table of knowledge. Although they encourage us to analyze what we see, consistent with Descartes's dictum that sensory data must pass through the mind to be understood, Vermeer's paintings celebrate a truth very different from that sought by Descartes.

## Clearing Customs

Rooted in pragmatic concerns, the provisional morality causes Descartes to reconsider early propositions. How do I behave, he asks, so as to enhance my chances of discovering the truth? He adopts the ethical code in order to live with conviction, resolutely, while he searches for the truth, "afin que je ne demeurasse point irrésolu en mes actions, pendant que la raison m'obligerait de l'être en mes jugements" [so that I did not remain irresolute in my actions while reason required that I be so in my judgments] (*Discours,* AT 6:22). He adopts this attitude despite his initial rejection in part 1 of the notion that one can determine the truth by observing certain customs. However prevalent, customs reflect a set of beliefs and practices that are purely contingent:

> Il est vrai que, pendant que je ne faisais que considérer les mœurs des autres hommes, je n'y retrouvais guère de quoi m'assurer, et que j'y remarquais quasi autant de diversité que j'avais fait auparavant entre les opinions des philosophes. En sorte que le plus grand profit que j'en retirais, était que, voyant plusieurs choses qui, bien qu'elles nous semblent fort extravagantes et ridicules, ne laissent pas d'être communément reçues et approuvées par d'autres grands peuples, j'apprenais à ne rien croire trop fermement de ce qui ne m'avait été persuadé que par l'exemple et par la coutume; et ainsi je me délivrais peu à peu de beaucoup d'erreurs, qui peuvent offusquer notre lumière naturelle, et nous rendre moins capables d'entendre raison.
>
> [It is true that, as long as I considered only the customs of other men, I found scarcely anything to reassure me. Indeed, I observed as much diversity in these customs as I had formerly seen in the opinions held by philosophers. In fact, the greatest benefit that I obtained was from seeing that many things, although they appear to us to be extremely foolish and ridiculous, are nevertheless commonly held and endorsed by other great nations. I therefore learned to believe nothing too firmly concerning what I had gleaned only through example and custom. In this way I released myself little by little from many errors that can block our natural light and make us less capable of listening to reason.] (*Discours,* AT 6:10)[4]

Customs differ from country to country, and, as John Lyons has argued, diversity "is for Descartes almost a synonym for error."[5] In part 3, however, Descartes resolves to adopt provisionally a particular ethical code in order to have a solid foundation for developing his theory. He adopts a series of moral principles that oblige him to follow the example

of others, that is, to respect the very customs whose validity for the method he denies. The subject who goes out into the world accepts custom, whereas the subject who engages in metaphysical thinking does not: "All of the arbitrariness of customary conduct, formed of a pure historical contingency, is accepted by the protagonist who had determined not to follow example and custom in part 1. The inner 'I,' concerned with the pure distinction between true and false, does not have a social conduct but only an intellectual one and rejects example."[6] Buttressed with an identifiable, albeit arbitrary, moral code, Descartes functions in society (although he seems to stay in his heated room quite a bit . . . ) well enough to facilitate his understanding of the metaphysical subject, the "I" of the Cogito whose existence no thought allows him to doubt. The subject of the provisional morality thus remains (provisionally) distinct from the more important thinking subject engaged in developing a system based not on example but rather on cogent analysis ordered through deductive reasoning. While it ensures the coherence of the method by separating a set of lived experiences from his theory, this distinction exposes a crack in the logic of the *Discours*.

Lyons has shown that Descartes remains trapped between a quest for a "single path toward knowledge" and the knowledge that his reader may interpret his text less well than he intends; he fears, paradoxically, that the reader may corrupt his ideas by imitating his example.[7] Whether imitated or rejected, however, Descartes's example does much to inform us about complications implicit in the analytic model that he proposes. Indeed, the particular line of reasoning that Descartes adopts in his account of his discovery of the method reveals logical inconsistencies that complicate, and to some degree compromise, his science. I am concerned with the example of customs as it models a methodology for classification and, in particular, with customs as an exemplary class of examples—a paradigm of classified things—that informs Descartes's eventual written record.

In 1624 the theological faculty in Paris declared heretical all doctrine maintaining that matter consists of atoms. The same year parliament outlawed the adoption of principles that went against ancient authors and forbade individuals to give public lectures without the express permission of the theological faculty. These facts, coupled with Galileo's second condemnation in 1633, motivated Descartes's decision to move to the Northern Netherlands. To pursue his work he distanced himself from those he knew, seeking refuge in a country tolerant of scientific in-

vestigation (*Discours,* AT 6:31). Yet in the Netherlands, Descartes's status as a Frenchman living abroad, albeit contentedly, implies a certain alienation. While he admires the Dutch for maintaining a proper distance from and an apparent lack of interest in the affairs of others—he deems them "plus soigneux de [leurs] propres affaires, que curieux de celles d'autrui" [more concerned with their own affairs than curious about those of others] (*Discours,* AT 6:31)—he does not renounce his French identity. Indeed, at the beginning of the provisional morality, when he rejects the customs of the Persians and the Chinese in an argument that opposes "us" and "them," the "us" to whom he refers ("parmi nous" [among ourselves]) refers as easily to "we French" as to "we Europeans" (*Discours,* AT 6:23). The imprecision of Descartes's references—the fact that when he draws a distinction between two classes of things (here two kinds of national identity) he does not do so clearly—implies that the process of building a table of record, of sorting out identities, may well obscure the truth.

Descartes specifically states that he intends to respect the laws and customs of "ceux avec lesquels [il] aurai[t] à vivre" [those with whom (he) should have to live], yet his first maxim is "d'obéir aux lois et aux coutumes de [son] pays" [to obey the laws and customs of (his) country], presumably France, though possibly, given his current domicile, his adopted country:

> La première [maxime] était d'obéir aux lois et aux coutumes de mon pays, retenant constamment la religion en laquelle Dieu m'a fait la grâce d'être instruit dès mon enfance, et me gouvernant, en toute autre chose, suivant les opinions les plus modérées, et les plus éloignées de l'excès, qui fussent communément reçues en pratique par les mieux sensés de *ceux avec lesquels j'aurais à vivre.*
>
> [The first was to obey the laws and customs of my country, holding faithfully to the religion in which God had the grace to instruct me from my childhood, and governing myself in all other respects according to the most moderate and least extreme opinions that were commonly accepted and practiced by the most reasonable *people with whom I should have to live.*] (*Discours,* AT 6:22–23; my emphasis)

In part 6 Descartes refers to French as "la langue de mon pays" [the language of my country] (*Discours,* AT 6:77), making it more likely that the initial reference here to "my country" is to France. Were he to follow French customs in the Netherlands, however, Descartes would be work-

ing against his stated principle of respecting the customs of the country in which he resides. Moreover, Descartes insists that when he pledges to adhere to the most moderate opinions, he means not only those *accepted* but also those *practiced*. The former could mean an avoidance of political arguments, in which case the concept of moderation is clear. His physics, however, is hardly moderate. Even though Descartes has peers in the Netherlands who are involved in areas of research related to his own, and even though Dutch society remains open to such thinking, it clearly forms part of an avant-garde and is therefore difficult to reconcile with the notion of moderation, even among "reasonable" thinkers. The second qualifier, opinions "practiced," returns the argument to customs and accepted norms. Outside the scientific community, where practice, by definition, involves testing new ideas, the concept refers to religious observances, daily conventions—the set of social codes that, according to the logic of this passage, identify the Dutch as *different* from the French. If they are indeed different, Descartes cannot both "respect the laws and customs of his country" (France) and also respect the standards for the most moderate behavior in the Netherlands.

Descartes refers specifically to his life as a Catholic in a largely Protestant country. Catholicism is not, from the majority Dutch point of view, the "most moderate and least extreme position." Why would Descartes show the courage of his religious convictions and not do the same in other matters? Perhaps the philosopher does so out of sincere religious conviction, perhaps out of fear of censure by the French or by the Church, or perhaps both. To the degree that religion has infused itself into the cultural core of the Netherlands (as elsewhere, notably in France), it is difficult to imagine how Descartes could both respect his religion and follow the practices of the Dutch, even as they "moderated" religion, in the ways I discussed in chapter 1, to support the demands of increased trade and profit. I am concerned not with how Descartes actually chose to live, but rather with the logic of his argument, which introduces distinctions that it cannot sustain. At stake here is a method for discourse, a structure for assembling identities and building a body of knowledge.

Descartes's phraseology leaves us in doubt as to whether he lived like a Frenchman in the Northern Netherlands, or whether he lived there as a French Catholic, or whether, save his thoughts about religion, he respected Dutch laws and customs. Descartes could easily have respected Dutch practices in his daily commerce while remaining authentically

French in his private world, as in his thoughts. Such behavior, in fact, would be entirely in keeping with his cogitations. He seeks in his seclusion and ultimately in his mind to know himself as having and inhabiting his thoughts (subjectivity). By living in relative isolation, he can devote himself to his theories and their implications for his metaphysics, all the while avoiding conflict and debate about these ideas until he has completed his work. Nevertheless, the status of being French in the Netherlands, this simultaneously harmonious and yet estranged existence within the country offering a safe haven, implies that in the doubling of identities, the play of interior and exterior, and the opposition of the pragmatic and the theoretical there exists a significant tension. The specific categories that Descartes invokes to explain his experience—my country; me; us; them—remain ambivalent, and this ambivalence is troubling in the search for truth. Descartes explains that customs function according to a common set of practices and beliefs. Indeed, customs are a model of modeling, the quintessential paradigm of practices already identified and ordered. One can imagine a tree diagram that unites separate branches of French, Dutch, Persian, and Chinese practices in another branch called customs. Yet Descartes's examples serve merely to accentuate the tension between his particular experience and the rule. He has crossed, literally, across the frontier from one set of customs into another, and the lines of conduct remain blurred. Logically, in terms of the designation of kinds and classes of behavior, the relations that he establishes between the part and the larger whole of experience, as of knowledge, falter.

Descartes intends to follow established models to facilitate his capacity to "entendre raison" [to listen to reason], that is, to work via his intuition through a series of logical deductions that will yield the truth. It is not at all clear, however, why respect for a certain code of behavior would facilitate his cogitations. We are entitled to ask why the familiar would help him defamiliarize his experiences, why it would facilitate the practice of radical doubt, the negative thinking that opens up philosophy by denying all customary assumptions so as to start anew the analytic process.

Presumably, by engaging him in a regular course of activities, Descartes's respect for customs affords him basic stability, thereby freeing up his mind and fostering a certain energy. The philosopher surely adopts the prudent course in opting to follow moderate opinions and sensible behavior:

Et entre plusieurs opinions également reçues, je ne choisissais que les plus modérées: tant à cause que ce sont toujours les plus commodes pour la pratique et *vraisemblablement les meilleures,* tous excès ayant coutume d'être mauvais, comme aussi afin de me détourner moins du vrai chemin, en cas que je faillisse, que si, ayant choisi l'un des extrêmes, c'eût été l'autre qu'il eût fallu suivre.

> [And when there were several equally well accepted opinions, I would choose only the most moderate, both because these are always the easiest to put into practice and *probably the best,* given that any excessive behavior tends to be bad, and also so that if I ever made a mistake, I would nevertheless still be closer to the correct path than if I had chosen one of the extreme positions and it had been the other that I should have followed instead.] (*Discours,* AT 6:23; my emphasis)

While it is possible, and even probable, that modeling oneself after those with whom one lives in society and those who eschew extreme ideas and opinions allows one the best chance of developing one's ideas into a valid theory, this approach does not necessarily ensure success. Conceivably, one could find a deeper understanding were one to live in unfamiliar circumstances, just as one might devise a more convincing argument by pursuing a radical idea than by starting from a moderate position. In an argument expressed in decidedly Aristotelian and geometric terms, Descartes reasons that it is easier to work back from an error if one positions oneself in a centrist position than if one starts at either end of the spectrum of possibilities. If the solution requires radical thinking, however, one could conceivably achieve the desired end more quickly were one to argue from the extreme position. The political risks of the radical solution may be greater, of course, but the logic for solving problems in this manner may prove more efficacious. Moreover, one may work back from even a disappointing radical solution to the desired result. I do not here dispute the fact that the provisional morality worked successfully for Descartes. Rather I underscore how the examples that Descartes invokes to describe the history of his perfection of the method serve in the end to increase rather than to reduce the number of possible meanings he specifies. To the extent that it thus multiplies possible meanings—classifiable identities, in this case those pertaining to his experience—the provisional morality fails to establish more than a probable truth.

## Assuming the Best

How do we reconcile the probability afforded by the provisional morality—the likely but still uncertain truth that it provides—with the philosopher's insistence that within the method the probable be discounted, that one classify only identities that are certain? Descartes posits, consistent with mathematical proofs, that once he has mastered a few essential principles, he will be able to use them to arrive at the truth. From this point on, he can dispense with the provisional morality. The provisional morality and the method are, I indicated earlier, distinct realms: the former prescribes the behavior of a human being, a corporeal presence within society, whereas the latter prescribes a logical analysis and is the exclusive domain of the mind. Descartes sees no impediment to his research in the fact that he establishes two different sets of conditions: the one practical, referring to human conduct with all of its inconsistencies; the other theoretical, bound to an absolutely rigorous analysis. He will move out of the merely probable realm of the provisional morality into the absolutely coherent realm of the method, which alone yields the truth.

As Étienne Gilson explains it, Descartes's reasoning represents, *avant la lettre,* an almost Pascalian wager that his approach offers the best odds for success:

> Là où l'usage de la vie n'est pas en jeu rien ne nous oblige à devancer l'évidence et le probable ne vaut pas mieux que le faux; là où l'usage de la vie est en jeu, refuser de vouloir le bien le plus probable serait nous condamner volontairement au malheur. Ainsi, toutes les règles de la morale provisoire présenteront ce double caractère: de n'être pas des vérités démontrées et d'être, par conséquent, sans valeur théorique, mais d'assurer pratiquement à l'homme qui ne connaît pas le bien avec certitude, ou même qui l'ignore complètement, les chances les plus nombreuses de le rencontrer.
>
> [Where it is not a question of customs (the ways of the world), nothing requires that we go beyond the obvious, and the probable is no better than the false; when it is a question of customs, to refuse to want the most likely good would be to condemn ourselves willingly to misfortune. Thus all of the rules of the provisional morality will present this double character: they will not be demonstrated truths and they will, consequently, have no theoretical value; but they will assure man, who does not know good with certainty, or may even be completely ignorant of it, the greatest chances of discovering it.][8]

Unlike Pascal, of course, Descartes seeks not an argument of faith but one of reason. Still, we wonder how Descartes can establish the complex relations between things if a single example in his text, a single paradigm such as customs, can prove so cumbersome, so indeterminate. The question becomes: Will the method allow him to isolate and to identify individual facts? If so, will his account of this discovery be sufficiently refined to specify a particular identity and its relation to other identities without obscuring it or them? No logical system but rather the will [*volonté*] to knowledge explains the leap from Descartes's provisional morality to his theory. Consistent with a long philosophical tradition, Descartes believes that the will is moved by the intellect, and that the will is not only free but also inclined to do good. Gilson notes:

> Normalement, la volonté se règle sur l'intellect et, dès qu'il y a connaissance, la liberté consiste à s'y soumettre. . . . [La volonté] est par définition une 'facultas electiva' et son essence même l'oblige à choisir dès l'instant où elle aperçoit un "bien."
>
> [Normally, will is governed by the intellect, and as soon as understanding is produced, freedom consists in using will to comply with it. . . . Will is by definition a "facultas electiva" and its very essence requires that it choose from the moment when it perceives a "good."][9]

The well-established argument whereby one elects to do good whenever the possibility arises sounds much like the argument that the world is ordered because God would have it no other way.

Gilson offers an explanation of the mathematical thrust of Descartes's method, his reliance on a chain of deductions that imitates a mathematical equation, which provides a key to understanding this issue:

> L'analyse géométrique suppose un artifice préliminaire, qui lui confère son caractère propre: considérer (le problème) comme déjà fait et donner des noms à toutes les lignes qui semblent nécessaires pour le construire, aussi bien à celles qui sont inconnues qu'aux autres.
>
> [Geometrical analysis supposes a preliminary artifice that defines its functioning: it considers the problem as already resolved and gives names to all the lines that seem necessary to construct it, those that are unknown as well as those that are known.][10]

Similarly, Gilson explains, for Descartes's notion of truth there is an assumption of the *already there,* the already resolved:

> À partir du moment où je renonçais à régler mes actions sur une connaissance théorique du bien qui m'était alors inaccessible, il ne me restait plus qu'à chercher provisoirement cette règle hors de moi-même; or, du point de vue des avantages pratiques, aucune ne pouvait l'emporter sur la résolution de me conformer à la coutume reçue, et spécialement à la manière d'agir des "mieux sensés," c'est-à-dire des hommes les plus manifestement doués de prudence et de bon sens.—Pour passer de cette règle empirique de la morale provisoire à la règle théorique de la morale définitive qui lui correspond, *il suffit de supposer la raison devenue maîtresse de la vérité ou des principes dont on peut la déduire; elle est alors capable de régler elle-même sa propre conduite, sans recourir au critérium purement empirique et extrinsèque de la coutume suivie par les meilleurs.*
>
> [From the moment when I gave up basing my actions on a theoretical knowledge of the good that was inaccessible to me, I had no choice but to look provisionally for this rule outside of myself. From the point of view of practical advantages, none proved better than that of respecting established customs, and especially the way in which the "most sensible people" behaved, that is, those most obviously endowed with prudence and good sense. To go past this empirical rule of the provisional morality to the theoretical rule of the definitive morality that corresponds to it, *one merely has to suppose that reason has become the mistress either of truth or of the principles from which the truth can be deduced; it is thus able to regulate its own conduct by itself, without recourse to the purely empirical and extrinsic criterion of customs respected by the best men.*][11]

The mind can move from an intuition through a series of deductions to the truth. This process, however, implies the same need for a starting point: "One merely has to suppose that reason has become mistress of the truth." Even more striking than this premise is its reliance on the notion that reason can provide the truth—a plausible theory, but one that could prove wrong, that could be just an act of faith in science. The supposition of the "already resolved" stipulates not that the truth must come to Descartes all at once but rather that, slowly but surely, he can extract from his thinking the small number of principles necessary for him to deduce the truth.[12] Descartes presumes, however, that truth is possible, and that the process for discovering it has an origin: the moment when he applies his *bon sens* [good sense], his capacity for reason, judgment (*Discours,* AT 6:6).

Descartes applies his good sense to selecting those (like himself) whose superior application of their good sense makes them appropriate

guides, and then he proceeds to establish his method. He selects out the best class of individuals, which choice may have an impact on his findings. Reason, moreover, does not *acquire* the capacity to perform; Descartes begins with the assumption of its perfect functioning. Using geometry as his model, he employs the "preliminary artifice" of considering the problem "already solved," and then devises the lines of argumentation necessary to explain it. He also presupposes, consistent with a long tradition, that God is not a deceiver, that he has not endowed man with reason in order to lure him into false understanding. Descartes presupposes that man can use reason to unlock the secrets of the universe, an assumption the philosopher bases on his formulation of an order within nature. For all of its currency in the seventeenth century, this assumption of an order "already there" to be discovered constitutes not a truth but rather a probability that could prove false and therefore corrupt the data that Descartes obtains.

If the series of deductions ensures a perfect argument, the "artifice" of presuming that the problem contains its solution ensures that a gap persists between the knowledge produced through representation—method—and other possible identities excluded from the initial proposition. Descartes's exposition of his method seems troubling precisely because he proposes as an answer the very question whether reason, a Euclidean solution, can govern our understanding of the whole of nature. Descartes knows before applying his reason that he can reason effectively, and that he can apparently do so despite the fact that his thoughts on a number of salient points have been ambiguous at best. These ambiguities function differently from doubt within his system, for doubt enjoys the salutary function of suspending the philosopher's judgment until he can confirm the validity of his thoughts. The ambiguity surrounding Descartes's cultural experience suggests, on the contrary, that even when one arrives at a logical conclusion, and one has created a certain number of alternative hypotheses that one rejects, there may exist still other hypotheses and other data that one has not yet named but that are also potentially valid. If customs can be alternately sustained and negated by Descartes's example—by his own behavior and, more important, by his conceptualization of that behavior in the *Discours*—then clearly nothing is certain except one's ability to construct a system that makes the classification of customs appear certain. One obtains not the desired truth but rather a knowledge rooted in verisimilitude—not truth but a representation of it, data carefully ordered into a system that, by presupposing a resolution

*already there,* makes sense. Such a representation, however, also implicitly identifies the meanings it conveys to be a subset of all possible data, part of the whole that constitutes the absolute totality of the universe as it connects to the notion of an infinite perfection. The assumption of the truth already there is the equivalent of an artificially closed and regular representation whose coherence depends on its own rules rather than the real it analyzes. Weaknesses in the system emerge in the ambiguities that occur throughout Descartes's narrative, in the meanings that slip outside the categories he erects—meanings he fails to identify with certainty.

Descartes clearly intends to proceed with his analysis of corporeal beings, the stars, the earth, and the like, only once he has eliminated all doubt. His very procedure, however, suggests that even after he substantiates something through a kind of mathematical proof, there exists the possibility, and indeed the probability, that some unknown factor remains undetected that has the potential to restrict or otherwise challenge the purported truth. If the microscope and the telescope expose things that far exceed what the naked eye can see, what will stronger lenses, enhanced technology, produce in the future? Without going so far as to adopt Pascal's faith in an infinite expansion of things in the world, one may argue that Descartes cannot pretend to eradicate from science all possible errors. Instead, he can only restrict his analysis to a specific set of data and then filter the data through the grid, or frame, that he has established consistent with his rules. But the part, as Descartes knows all too well, does not always represent the whole, and even when it does, the whole remains very much at a distance: "Mais il faut aussi que j'avoue que la puissance de la nature est si ample et si vaste, et que ces principes sont si simples et si généraux . . ." [But I must also recognize that the power of nature is so full and so vast and that these principles are so simple and so general . . .] (*Discours,* AT 6:64). Indeed, were we to allow, as a theoretical possibility, that Descartes, when dealing with a finite set of data, could exhaust the possible combinations of identities to arrive at a thoroughly complete and therefore true understanding of them, we would still need to recognize that the classification of even a single identity is a slippery business. And, as the quotation suggests, Descartes slips back into this business in part 6 of the *Discours.*

Writing the concluding portion of the *Discours* three years after he completed the rest, that is, once he had established the method and be-

gun to apply it, Descartes ends on a note of disturbing equivocation.[13] Explaining how he undertook to compose an account of his ideas, he pointedly acknowledges the power of Church and State over his actions, if not his thoughts: "des personnes à qui je défère et dont l'autorité ne peut guère moins sur mes actions que ma propre raison sur mes pensées" [some people to whom I defer and who exert almost as much authority over my actions as my own reason does over my thoughts] (*Discours,* AT 6:60). Descartes affirms that someone (Galileo) had been censured for an opinion that was not one to which he subscribed: "une opinion de physique . . . de laquelle je ne veux pas dire que je fusse" [a theory concerning physics . . . which I would not say that I shared] (*Discours,* AT 6:60). Nevertheless, Descartes allows that he judges this opinion to be unobjectionable to either the Church or the monarchy. Siding with Galileo without declaring his support, Descartes equivocates; he acknowledges the power of Church and State without denying his own power to reason differently.

He writes to clarify his ideas for the record so that both the certainty of his proofs and his intention to offend no one be clear. More than logic, since he is arguing both sides to the middle, Descartes needs a firm rhetorical stance. He enhances his position by claiming for posterity that he has the obligation to work for the common good according to the "law" that rules all men. To this end he will publish his results, which will assist mankind in taming nature so as to improve the quality of life. Descartes explains that as long as he reaped no benefit from the method other than his personal satisfaction in attempting to resolve problems in the sciences, or in governing his own behavior through the reasons that it taught him, he did not believe himself obligated to write anything down. He returns to the example of conduct and customs (*mœurs*):

> Car, pour ce qui touche les mœurs, chacun abonde si fort en son sens, qu'il se pourrait trouver autant de réformateurs que de têtes, s'il était permis à d'autres qu'à ceux que Dieu a établis pour souverains sur ses peuples, ou bien auxquels il a donné assez de grâce et de zèle pour être prophètes, d'entreprendre d'y rien changer.
>
> [For as regards conduct, everyone is so full of his own wisdom that we would likely find as many reformers as heads if anyone other than those whom God established as sovereigns over his people or those on whom he has bestowed sufficient grace and zeal to be prophets undertook to change things.] (*Discours,* AT 6:61)

Declaring his intentions to leave political and religious reform to others, that is, to eschew all challenges to the crown and to the Church, he restates his belief that particular practices convey only relative values (truths). Such practices are specific to the group that adopts them, whether that group be a nation or a church. With his physics, however, Descartes's attitude changes:

> Mais, sitôt que j'ai eu acquis quelques notions générales touchant la physique, et que, commençant à les éprouver en diverses difficultés particulières, j'ai remarqué jusques où elles peuvent conduire, et combien elles diffèrent des principes dont on s'est servi jusques à présent, j'ai cru que je ne pouvais les tenir cachées sans pécher grandement contre la loi qui nous oblige à procurer, autant qu'il est en nous, le bien général de tous les hommes.
>
> [But once I had acquired some general ideas about physics and began to apply them to a variety of different problems, I realized just how far they could lead, and how much they differed from the principles used up to now. I believed that I could no longer keep them hidden without committing a grave sin against the law that requires us to do everything within our power to enhance the welfare of all mankind.] (*Discours,* AT 6:61)

The method should enable Descartes to revisit the issues raised as probabilities in the provisional morality and to establish them with certainty. Yet as he returns here to the example of specific behaviors (*mœurs*), he equivocates. His posturing to avoid censure and his statement that he has regulated his conduct according to what reason had taught him do not mesh easily with his acknowledgment that the crown and the Church impose their rule on him. Descartes conforms, but only, it seems, to a certain extent. Reason has led him to believe differently, to locate truth outside the constraints imposed by religion and the monarchy. Declaring his good intentions and his submission to higher powers, Descartes goes on to assert the authority of his text and the truth that he has uncovered. He affirms that he hopes, through persuasion—the power of his logic—to instill this truth in those very authorities who continue to resist him. In this passage a finely layered rhetoric binds the divine right of kings, religious faith, and Descartes's science. His own reasoning, notably his physics, separates him from ideas and behaviors that exist, that survive or fail, solely as the province of those in power. Yet his science is circumscribed not only by a larger political reality but also, and more important for the integrity of his theory, by a still inaccessible perfect order in which all identities are knowable and in which truth governs men's ac-

tions. In place of this absolute science he continues to offer a probable success, a fable of truth through method that in appearing to identify things with certainty actually structures a partial and therefore unstable and uncertain knowledge.

As Descartes demonstrates not only in the provisional morality but also, significantly, in his account of what follows his discovery and application of the method, representation does have the potential to obscure rather than simply to enlighten. In its careful ordering and measuring of things, representation creates a particular, restricted knowledge that depends on an idea of the *already there* in the form of an *already ordered* (imperfectly, via custom; perfectly, via God), which Descartes projects onto a world that is vast and complex, constantly changing, and whose inner workings, whose real order, may be disorder or even chaos. Moreover, the will that allows Descartes to move successfully, at least theoretically, from the provisional morality to the application of the method can also be defined as the will to create a system. This relation holds even though the particular system may vary from case to case, experiment to experiment. One can understand specific behaviors only within a system of cultural codes that one imitates, just as properties of light assume meaning within a paradigm of physics that includes the sun and the eye, the theoretical model devised through observation and analysis. We have seen, however, that Descartes conflates the search for truth both by multiplying analytic categories related to customs and by selecting out certain meanings from all possible meanings. That is, although he affirms a number of possible identities, he makes us aware of others that he cannot classify, that remain ambivalent. Recognizing the system as an artificial frame, a finite logic, we discover a restricted knowledge, a probability that stands in for the truth. But we want to believe, and this artifice leads us back to Vermeer.

## Procuring Meanings

Like many of his contemporaries, Vermeer frequently incorporated paintings within his paintings, and scholars have long been intrigued by their special status within his corpus.[14] The inserted painting functions as a paradigm through which to explore the full work, much as the example of customs helps to elucidate Descartes's provisional morality as it in turn models his full discourse on the method. In art the painting within the painting and the larger painting of which it forms a part together

constitute a class of similar things. The fact that Vermeer creates a series of paintings with inserted paintings, moreover, allows us to look beyond an isolated paradigm to a series of paradigms, that is, to the nexus of relations that forms as we consider several works together.

Even the casual observer of Vermeer's oeuvre cannot fail to notice the importance of the inserted paintings for the decor. As I discussed previously, these objects added realistic details to settings that appealed to a prosperous middle class for whom the display of familiar objects had particular resonance. Some of Vermeer's paintings with inserted paintings tell an even more inviting story about Vermeer's art, for they include inserted paintings fashioned after a known model.[15] Dirck van Baburen's *Procuress* (1622, Museum of Fine Arts, Boston) (fig. 4), which appears in both *The Concert* (plate 11), and *Lady Seated at a Virginal,* belonged to Vermeer's mother-in-law, and either it or a copy of it is believed to have hung in his home.[16] But the availability and familiarity of this and other examples modeled after extant paintings does not explain Vermeer's choice to include paintings within his paintings or his artistry in crafting his images. Here I examine his *Concert, Music Lesson* (plate 12), and *Procuress* (1656, Staatliche Kunstsammlungen, Dresden) (plate 17), with additional references to *The Art of Painting* (plate 4). Individually and collectively, these paintings reveal ways in which Vermeer structures knowledge through a highly refined compositional technique. For this reason I consider his paintings to model a system for classifying objects that has implications for Descartes. Although Vermeer painted *The Music Lesson* before *The Concert,* I initially discuss them in reverse order because the later work includes two inserted paintings that suggest a number of relations critical to the full series. I consider all four paintings, chronologically, in the final section to assess the evolution of Vermeer's treatment of the *mise en abyme.*

While scholars agree on the importance of the paintings within the paintings, no definitive interpretation of their function prevails. Certain thematic convergences exist: the recurring themes of love, vanity, morality, and spirituality. Another consistency, as Gregor Weber notes, is that the subject matter or the style of the larger works remains distinct from that of the interior paintings: "One does not find in these bourgeois interiors comparable painted depictions of bourgeois interiors."[17] Overall, the visual appeal of Vermeer's images connects with the viewer's appreciation of art that validates the home as a locus of moral propriety, do-

mesticity, social contact, and commercial success. Yet Vermeer's images, especially when considered as a series, show him exploring tensions within society, although he avoids explicit polemics. We read the principal scene against the painting set within in it, and vice versa. We cannot know, however, whether Vermeer means to establish a relation of contrast between the primary painting and the inserted painting or instead emphasizes a relation of consistency between them. Does the internal painting send a cautionary message to the figures in the full work, or does it communicate moral flaws already tested? We are left to ponder what precisely the interior model tells us about the larger work.

All *mises en abyme* serve, as André Chastel has argued, to establish the works in which they are contained as "unreal," painted scenes:

> Le tableau-dans-le-tableau incite, d'une manière exceptionnelle, à rappeler que l'ouvrage peint n'a jamais été purement et simplement un morceau de nature, qu'il est un *artificium,* dont l'esprit doit savoir tirer parti. Le problème sous-jacent est clair. En accentuant les caractères physiques du tableau, le peintre insiste moins sur les rapports de l'ouvrage-miniature représenté sur la toile avec la nature qu'avec le tableau même où il se trouve; c'est impliquer inversement que celui-ci appartient, dans une certaine mesure à la même classe d'objets que le tableau peint.
>
> [The painting within the painting serves most extraordinarily as an indicator that the painted work is never purely and simply a piece of nature; it is an *artificium* that the mind must know how to utilize. The underlying problem is clear. By emphasizing the physical traits of the painting within the painting, the painter insists less on the relation between this miniature work and nature than between it and the larger painting of which it forms a part. Inversely, this relation implies that the full painting to some extent belongs to the same class of objects as the inserted painting.][18]

With Vermeer the effect of art framing a class of objects of which it, too, forms a part becomes more pronounced as one studies the evolution of his art. Although he insists on "intra-imaging," paintings within paintings, he does not ask us to look for "inter-imaging," connections between his works. Vermeer intends each painting to stand on its own. I set up the series, however, to show what happens when we extend the classification scheme based on analogy. The single, certain identity forms the building block of the table. It follows that if one identity replicates another, if one representation imitates another representation, the double should rein-

force or validate the original. Yet validation, I argue, does not always occur. Consequently, the table of identities that we construct based on them can become very wobbly. Vermeer's *Concert* presents a stunning first example of these complexities.

## *The Concert*

*The Concert* depicts a moment of actual performance. One woman plays the harpsichord; another sings; the male figure uses a stringed instrument. The bass viol on the floor near the table, beckoning someone else to play its strings, invites love into the room and announces the theme of seduction. How are the desires of the three individuals satisfied? In concert, certainly. The formation of couples, however, and specifically the value assigned to them, depends not on the disposition of the figures within the painting alone but also on their relation to the paintings within the painting. On the left hangs a landscape. The harpsichord cover, too, presents a landscape, but whereas the framed painting depicts nature untamed, the harpsichord motif suggests calm.[19] On the right hangs van Baburen's *Procuress,* depicting the prostitute with her instrument (an invitation to sexual relations), the customer ready with his coin, and the procuress. The trio of painted figures mirrors the musical trio engaged in concert. As in the picture on the wall, the man appears between two women. The one on his right is marking time, facilitating, as it were, not only her singing but also the gentleman's relationship with the other woman at the harpsichord. Are the concert players implicated by van Baburen's painting or protected from its immorality? We cannot know.[20] The analogous relations structured through the inserted paintings produce no certain meaning but rather sustained contrast, persistent doubt. The van Baburen painting brings into play, as it were, the possibility that musical harmonies will transform the trio into a duo. Sexual harmony, however, involves a discordant third figure—the procuress in the painting and her counterpart, the singer.

Each pair of images—the two landscapes (framed on the wall and on the harpsichord cover) and the two trios (van Baburen's and Vermeer's)—establishes a tension of opposites. The rugged landscape aligns with the more lurid and profligate life of city streets and taverns of the Baburen image, where a woman's sexual favors are bought and sold. Conversely, the Arcadian scene on the harpsichord establishes a tranquillity whose measured rhythms echo in the concert. Exposure to danger and

corruption seems to diminish within the safe confines of the home. Making music, the three figures are sheltered from the forces of nature, as from the dangers of prostitution and evil commerce. Music, however, has a seductive, and potentially sinister, other side. Through associations of natural desire with the more salacious commercial activity of prostitution, *The Procuress* further identifies the concert as a source of pleasure for the middle class, which sustains itself by other, seemingly more sanctioned, forms of barter and trade. We are left wondering to what degree the tensions between outside and inside, public and private, nature and culture actually mediate *The Concert,* that is, to what degree the level of middle-class comfort and harmony that Vermeer depicts successfully evolves from commercial relations to remain consonant with the divine order of things as reflected in nature.

FIGURE 4. Dirck van Baburen, *The Procuress,* 1622, oil on canvas, 40 x 42 ⅜ in. (101.6 x 107.6 cm). Photograph © 2006 Museum of Fine Arts, Boston.

Money itself is not clearly vilified, for it stands behind the comfortable interior setting as a sign of bourgeois prosperity and security. The distinctive floor tile, the musical instruments (the harpsichord, the lute played by the male figure, as well as the bass viol and stringed instrument on the table), the chairs with their intricate fabrics, the table draped theatrically with a tapestry, its colors and patterns emerging under the light that flows into the room from the window concealed on the left, like the clothing, jewelry, and the paintings hung on the back wall all underscore a certain luxury. These objects evoke the solid economy of bourgeois transactions rather than the threatening degeneracy conveyed in *The Procuress*. Yet moral requirements to resist the corrosive influence of commerce permeated home life even as contemporary ideology endeavored to separate them. Schama argues that the virtue evident in the cleanliness of the home served as a cultural antidote to the negative effects of commerce:

> When properly established and run, the family household was the saving grace of Dutch culture that otherwise would have been indelibly soiled by materialism. It was the crucible through which rude matter and beastly appetite could be transubstantiated into redeeming wholesomeness. When food, lust, sloth, indolence and vain luxury were subdued by the domestic virtues—sobriety, frugality, piety, humility, aptitude and loyalty—they were deprived of their dirt, which is to say, their capacity for inflicting harm or jeopardizing the soul. Home was that morally purified and carefully patrolled terrain where license was governed by prudence, and the wayward habits of animals, children and footloose unmarried women were subdued into a state of harmony and grace.[21]

Vermeer's painting implicitly, if not conspicuously, frames the economic exchanges that assured the Dutch their place of privilege in ways that open up Schama's explanation. Vermeer affords the moneyed class a status associated with decorum and decency but also with excess. Commerce is good, provided that it not intrude on moral values, provided that it not spill over into mere indulgence of the flesh and of the mind that delights in viewing such corporeal excess.

Perhaps the scene in the foreground of *The Concert* shows a natural sexual attraction, a deepening love played out in the socially acceptable meeting of the gentleman and one of the ladies, a love made legitimate by the presence of the other woman. Despite Vermeer's precise definition of objects and figures within a setting remarkable for the stridently

whether they are decorous or indecorous, licit or illicit. The pitcher on the table (a miniature still life), like the marble tiles and the elaborate oriental carpet draped across the table, evidence Vermeer's talents in capturing textures, contours, and shadows. The empty blue chair and the bass viol invite the viewer to enter the painting, to partake of the visual delights that it offers. The chair beckons because it is empty; the instrument, symbol of love, because it needs to be played, caressed by a human agent in order to perform its enchantment. But these objects also delight the mind as it contemplates the effects of the mirror, the *mise en abyme* that declares everything in the painting to be a representation.[27] As Vermeer will do later in *The Art of Painting,* he uses the inserted image here in a way that informs the spectator of the artifice he has constructed. *The Music Lesson,* however, situates the characters in a more natural setting where no one seems to pose (although the figures arguably appear more stiff than the model dressed as Clio, enveloped in the voluptuous blue folds of her costume). The framed reflection in the mirror indicates the ability of the painting to assign a value to things. The multiple points of view—ours, Vermeer's, that of the artist reflected in the mirror, the passerby, the gentleman—work together as a perfectly calibrated series to produce a certain knowledge by restricting all movements, all meanings, to what they alone can convey.

The fact, moreover, that the mirror needs to be angled forward in order to capture the position of the girl's head further indicates how, although it appears natural, the setting depends on Vermeer's explicit perspectival calculations.[28] It affirms the existence of a compositional eye as keen as that of the imaginary painter who reveals just enough of his presence to remind us that we are not observing a real scene that unfolds continuously, as it would on the wall of the camera obscura, and that he has stopped all motion to freeze the objects and images in space as in time. Whatever the suitor's true intentions, the telescoping of the viewer/creator's gaze into the room assures us that he will do nothing untoward. The frame on the mirror places it in the same paradigm as the painting to the right, a third of which is visible, "just enough," Leonard Slatkes explains, "for the iconographically informed viewer" to identify it as a *Roman Charity,* like the one by van Baburen, depicting the imprisoned Cimon being nursed by his daughter Pero (fig. 5).[29] As the "charity" of the title suggests, Vermeer's inserted painting overcomes the taboo against intimate relations between father and daughter, for the gravity of Cimon's circumstances legitimates the image as Pero's expression of filial

gesting, Steadman argues, that Vermeer used a camera obscura. Whether this was Vermeer's technique, or whether he simply reproduced the approximate space of his studio in ways that imitated the image quality characteristic of the camera obscura, the interesting point for the relations that I am exploring is the element of calculation evident in the composition. The fact that the rooms share the same general dimensions, with the same light source on the left, and similar black and white tiles, which, though laid out differently, similarly fascinate through their patterns, indicates that Vermeer meticulously ordered these paintings as so many permutations of a particular geometric formula. He assiduously attended to the (re)organization of elements within a space bounded by the same walls, or frame structure. Whatever convenience the artist enjoyed in reproducing the approximate space of his studio, the resulting paintings, which respect, and arguably accentuate, the basic principles of linear perspective, recall Descartes's reliance on the four basic principles of the method. The objects of the painting do more than authenticate the decor, just as they do more than create a purely visual effect of refinement and grace within the home. They order knowledge.

In *The Music Lesson* we are not the only ones to view the young lady. The artist (Vermeer and/or his stand-in within the painting's mirror), a passerby, and the gentleman who purports to instruct her in music (and perhaps in love) all fix their eyes on her.[23] I specify the presence of the artist not only because every painting is framed in the eye and mind of its creator, but also because in the mirror above the virginal we see the base of a painter's easel supporting a canvas, the legs of a stool, and, positioned between the stool and the easel, the indistinct markings of a box for holding his paints and brushes, or perhaps a camera obscura.[24] The mirror serves, in Wheelock's felicitous phrasing, to remind us that Vermeer has "orchestrated" the entire scene of musical performance.[25] Recalling *The Arnolfini Portrait* (plate 2), the mirror establishes the painter as a witness to the event.[26]

We, too, occupy the monitor's position when we view the painting, imitating the painter as he surveys the scene, securing a perfect perspective. From the same vantage point we also adopt the perspective of the watching parent or spouse who assures the woman's perfect virtue as she learns to play the virginal, that is, as she comes to know both the game of courtship and the rhythms of passion. Moreover, both the painter and the viewer engage in a careful assessment of the space before them, judging each object and figure and their relation to one another, determining

whether they are decorous or indecorous, licit or illicit. The pitcher on the table (a miniature still life), like the marble tiles and the elaborate oriental carpet draped across the table, evidence Vermeer's talents in capturing textures, contours, and shadows. The empty blue chair and the bass viol invite the viewer to enter the painting, to partake of the visual delights that it offers. The chair beckons because it is empty; the instrument, symbol of love, because it needs to be played, caressed by a human agent in order to perform its enchantment. But these objects also delight the mind as it contemplates the effects of the mirror, the *mise en abyme* that declares everything in the painting to be a representation.[27] As Vermeer will do later in *The Art of Painting,* he uses the inserted image here in a way that informs the spectator of the artifice he has constructed. *The Music Lesson,* however, situates the characters in a more natural setting where no one seems to pose (although the figures arguably appear more stiff than the model dressed as Clio, enveloped in the voluptuous blue folds of her costume). The framed reflection in the mirror indicates the ability of the painting to assign a value to things. The multiple points of view—ours, Vermeer's, that of the artist reflected in the mirror, the passerby, the gentleman—work together as a perfectly calibrated series to produce a certain knowledge by restricting all movements, all meanings, to what they alone can convey.

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love. The painting may translate the desire of the suitor/instructor to transform his restricted relationship with the student into a licit love interest.[30]

It seems an appropriate allusion to Descartes to argue that the problem of knowing Vermeer's interior scene is "already resolved" as representation, as an order of things that originates in the painter's eye as he surveys the room and composes his image mathematically as well as visually. We cannot know with certainty, however, all that these relations signify. Is there or is there not a love interest in the music lesson? Who actually sees the woman's head reflected in the mirror? Is it a father sus-

**FIGURE 5.** Dirck van Baburen, *Roman Charity,* c. 1618–28, oil on canvas, 50 ¼ x 59 ⅛ in. (127.6 x 151.1 cm). York Museums Trust (York Art Gallery), York, England.

tained by his daughter, a father whose avid gaze projects some vital need? Does the teacher/suitor sometimes play the bass viol in the foreground, a prescient invitation to make music, a prelude to love? Does he sing to accompany her? The intimacy of this scene appeals to us because the objects evoke a kind of mystery even as they are displayed in their specificity, as objects available to observation and analysis. This other "lesson" of how to interpret the painting, this practicum, is *The Music Lesson*'s performance, its secret praxis. The mirror frames a space in which meanings continue to reverberate. Outside the world exists but is silent, unseen, save for the painter's partial reflection, and unavailable to us.

## Paintings in a Series

*The Music Lesson* legitimizes music and its evocation of love in the controlled setting of the home under the watchful eye of an observer. If this gaze allows for a disturbing element of voyeuristic control, it nonetheless frames the painting within a carefully manipulated perspective. Similarly, *The Concert* offers a veritable performance of restraint and propriety, to which the theme of the procuress nonetheless gives the lie by hinting at something more enticing. *The Art of Painting* removes any doubt about the importance of this knowing glance by multiplying the sets of eyes transfixed on the figure representing Clio: ours, Vermeer's, and those of the painter in the painting engaged in capturing the model on his canvas. We have seen that in *The Art of Painting* Vermeer celebrates not Clio so much as how the effects of the painter's own gaze are captured in representation, the painting he has begun to fashion. History itself is dressed by the painter, both literally, in the model's costume, and figuratively, to the degree that history is assigned meaning through art. The real subject is not the figured artist, who remains an anonymous persona viewed from the back, so much as the easel, now removed from *The Music Lesson*'s mirror and positioned prominently in the foreground. The easel is the locus of performance, the place where likenesses are captured and framed, where connections between model, costume, mask, draped tapestry, and map serve as so many indices of the artists' staging of history, both Vermeer's and that of his painted double clad in the distinctive slit doublet. All the rest, all real things and all experience, are relegated to a place outside representation, a space of oblivion, of erasure, of the unnamed and unknowable.

I have availed myself of these examples of the *mise en abyme* because each depicts the simplest of epistemological relations: the doubling of a single identity. If the method allows Descartes to establish individual identities, then the reprise of the method in discourse, the record of his discoveries, requires that he build associations between identities. He must begin to construct a table of knowledge by ordering different classes of similar things. Representation structures knowledge; it constitutes the source of our understanding of the world. In the artist's representation the *mise en abyme* constitutes one system of relations out of all possible relations. Most fundamentally, it reaffirms the value of the painting as art, as a construct rather than a slice of life. Through a reciprocal mirroring, the inserted image (whether painting or mirror), which is clearly a device that the painter elects to use, does, as Chastel indicates, identify the larger image as being similarly separated from the real, as artifice. Artifice here does not mean insignificant or nonsignifying, however. It means, as in Descartes, that we detect a definite starting point for knowledge, a point at which the painter, like the scientist, begins to set in place a system for ordering objects and figures and thereby to define them as things within a table of elements. It establishes the "already there," the ordering system into which all objects, all data, must be filtered.

This grid, or classification scheme, implies, of course, that there is no imitation of the truth, nor is there any discovery of the truth, except in representation. More than this knowledge about the function of representation, the paintings suggest a truth about classification that will continue to haunt the heirs of Descartes's method. Even if one were to grant that, inconsistencies in the provisional morality notwithstanding, Descartes in fact realizes his ambition of establishing the basic principles from which to deduce all the truths about nature—that is, even if one were to concede that there is nothing inherently flawed in the method itself—the problem remains that the philosopher has to classify what he orders and what he measures through his application of the method. Furthermore, even if Descartes's ordering and measuring of data were both unambiguous and complete because he restricted his analysis to a finite set of data, he would still need to incorporate these results into a representation, a published record. The *Discours*, as we have seen, presents ample evidence of the complexities that confound this process. Vermeer demonstrates two problems inherent in taxonomic work: identities

shift either because things themselves undergo a mutation or because a second manifestation of the same phenomenon is never completely identical to it. Van Baburen's painting is not the same as van Baburen's painting inserted into Vermeer's *Concert,* any more than Vermeer's own *Procuress* with four figures is identical to the van Baburen model with three figures. The fourth figure in Vermeer's work, the man holding a lute (perhaps Vermeer himself), looks provocatively at us, as if inviting us to share in his delight as he raises his glass to toast the soldier's successful negotiations for the young woman's favors.

The trajectory from the original van Baburen to Vermeer's *Procuress* marks a compositional progression that Vermeer's *Art of Painting* highlights and concentrates through the *mise en abyme.* Vermeer's painting and his imaginary painter's painting are similar, certainly, to the extent that both depict Clio. They are not, however, identical. As the viewer moves, across space as in time, from one image to the other, from the painting of Clio to the model herself, the various images add up to more than the sum of their parts. Vermeer depicts Clio not as a muse of history but rather as a model modeling the muse of history. Such transparency means that performance, the moment of composition on which the artist imposes his frame, literally and figuratively, takes precedence. Vermeer leads the viewer into the artist's studio not to commemorate history, not to validate interpretations that emblem books and published accounts have already ascribed to events, but rather to depict the act of imitation, representation, as the act of assigning values anew. Real history, both that which the Dutch Republic had recently undergone and that which it had idealized from the past, is reinvented by art, which celebrates its own power to name, and its propensity to rename.

What representation names is never simple, even when patterned on a single identity. Paintings within paintings both affirm and transform through their mirrorings. In *The Concert,* as part of a larger whole, part of a different context, the van Baburen *Procuress* allows for multiple relations with Vermeer's figures; it structures multiple meanings and ambivalences. The resulting conflation of identities allows us to see, moreover, that with every shift in context, the categories that one establishes for ordering identities seem brittle; they impose an "already known" on the new object, thereby altering or falsifying in some way the identity of the thing itself. Thus, were we to interpret the presence of van Baburen's *Procuress* as strictly a morality tale about the figures in the painting which

identifies them as somehow profligate, we would miss the essential tension of the work which also invites us to consider the stark contrast between them, or, as a middle term, to note the potential for corruption that underlies all human exchanges. A system based on likeness alone would skew the results, as would one based exclusively on difference. How can one capture both similarity and difference within the same analytic category without having everything remain obscure?

For the painter, the work of art that suggests these tensions is a sheer triumph, not only because it pleases the eye but also because in its ordering of things, and particularly in its association of disparate identities, it offers a compelling interpretation of the real and the tensions that underlie it. The scientist, however, would deny art (rhetoric) in favor of a mathematical precision. Though he would pierce the mysteries of the world to discover a final truth, however, he must communicate his discoveries in words, in a fable. For him the recognition of the artistry of his science is more unsettling. The need to classify what one sees, to order a representation, is, as Descartes's own examples show, by no means simple. Where one searches for truth, one discovers probability, a consistency in logic, but a logic clearly framed by the method. Indeed, the method artificially limits the truth at two levels: in its assumption of order, at the level of original analysis, and again in its ordering of data within the narrative. Representation relies not on the real order of things so much as on the coherence of things within the system of relations that the author or artist constructs to understand the real. This construct, in turn, becomes the "already there" of any future applications. Thus the table that Descartes constructs not only assembles identities but also informs and constricts any quest for truth.

The establishment of categories sets in place a first interpretation of the real; they include a certain set of values from which all deductions may flow in an uninterrupted chain, but from which other meanings—the possibly valid, the additionally valid, the otherwise valid of other cultures—are excluded. If the same thing means something different in subsequent manifestations, in different contexts, how can one be absolutely certain that the identity one has established is the right one? Without including all meanings, however, the table of elements assigns no final truth; it orders probability, custom, and practice. Vermeer celebrates this paradox through the many images that refuse to restrict the field of interpretations even as they insist on analogous relations. Art, moreover,

shows how even similar identities can contain the source of differences, how analogy can serve to expand rather than validate the categories that the author or painter creates to fix identities. Yet even as it abandons the analogous universe of the great chain of being, science is less inclined to recognize the value of the enigmatic end result, the pleasure of once again discovering the problem in the solution.[31]

# CONCLUSION

## Time Lines: Knowledge, Memory, and the Illusion of Truth

Descartes characterizes analytical thinking as a process that extends relentlessly forward over time, but in such a way that all the parts of an argument cohere with the moment that originates it. Peter Schouls notes that for Descartes "the prohibition against interrupting the flow of arguments points to the presence of memory: one cannot know this flow unless at least some of it is kept before the mind. Thus at the same time as the mind is extending the train of reasoning, it must cast itself backward for the sake of the right order."[1] In its insistence on a continuous deductive chain of reasoning, Descartes's formulation evokes the formal properties of narrative, the structuring of events over time. Indeed, memory, as it implies both an idea held in the mind like an image traced within the camera obscura and the patterning of ideas as they unfold one after the other—memory as it implies not only a fixed spatial relation but also the sequencing of temporal relations—oddly positions Descartes's science at the cusp of a narrative art, a most uncomfortable seat on which to rest his research. He succumbs to the lure of the fable but only, he insists, to direct his reader to the unique and universal truth that lies beyond it. Like the artist painting Clio, Descartes has a commanding view of his world. Like Vermeer, Descartes controls his fable, his term for the entire *Discours,* from a place outside it. Indeed, he would enjoy a totalizing view, a knowledge so full and complete as to be the truth, were it not for the fact that he himself has framed this view and assured its symmetry through his narrative art.

Within the frame of his text, space is partitioned to filter new knowledge (new observations) through categories of memory (classes of iden-

tities already determined). The experience of discovery involves a reference to what already exists, what has already been processed; one always narrates with an eye to the past. Science displays its categories in a table that requires, in addition to a keen sense of vision, all the mastery of an artist who knows how best to set it. Yet, for all that he sees and acknowledges, Descartes seems to cast a blind eye toward this aspect of his place in history. He does not account for the fact that his discourse harks back to the original moment when he determined the lines of his fable, his strategy for narrating his discoveries, and set it in motion.

Does memory, the mind's look backward for the correct order, compromise his thinking? My analyses in the previous chapters suggest that it does. The principle of memory implicit in the sequencing of ideas within a particular argument implies the subject's active recall of the steps leading to a particular conclusion. That is, knowledge reflects the subject's will to return, or not, to a certain number of points of reference. Order itself, we have seen, remains an unchallenged assumption in Descartes's work. The third rule of the method prescribes that one think in an orderly fashion. It requires that one begin with the simplest and most easily known objects and then proceed step by step to more complex ones, "supposant même de l'ordre entre ceux qui ne se précèdent point naturellement les uns les autres" [even supposing some order among objects that have no natural order of precedence] (*Discours,* AT 6:18–19). The assumed order is invented, imaginary, Schouls claims.[2] I have argued that the very assumption of order has the effect of artificially molding all data to conform to preestablished ideas. I liken such intellectual activity to the process of sifting data into categories of a table of elements. Whatever modification one makes over time to the original taxonomy, it must be acknowledged that all "new" forms take their identity from the old, existing model; a class of new identities emerges when old ones release new patterns. Whether dealing with metaphysical properties or physical properties, Descartes molds identities to conform to an established "memory" or frame for experience. Thus even his most progressive research hints at a certain conservatism, a return to a fixed order. Moreover, memory also helps to explain Descartes's concern with formulating a record of his accomplishments for posterity. He calls upon the reader to remember and thereby recognize and authenticate him as author, the authority behind the method. The readerly act of commemoration occurs via the medium of narrative, the autobiographical account of Descartes's discovery of the method. The result, however, is a blurring of boundaries

between art and science. If science relies on an irrefutable, mathematically rigorous logic to produce the truth, the narrative through which Descartes communicates these results inadvertently celebrates itself as art. Memory, after all, involves the creative process of selecting out certain entities over others. It involves the collapsing of identities into a frame that, set against the infinite expansion of experience, stands as a construct, an art, suspended in time.

Descartes admits a comparison with art but never acknowledges the distortion, the artifice, that he produces through his own narrative technique. I return to his evocation of the rules of perspective to examine how his own example suggests a counterexample, a final suspension of his underlying logic:

> Mais, tout de même que les peintres, ne pouvant également bien représenter dans un tableau plat toutes les diverses faces d'un corps solide, en choisissent une des principales qu'ils mettent seule vers le jour, et ombrageant les autres, ne les font paraître qu'en tant qu'on les peut voir en la regardant: ainsi, craignant de ne pouvoir mettre en mon discours tout ce que j'avais en la pensée, j'entrepris seulement d'y exposer bien amplement ce que je concevais de la lumière; puis, à son occasion, d'y ajouter quelque chose du soleil et des étoiles fixes, à cause qu'elle en procède presque toute; des cieux, à cause qu'ils la transmettent; des planètes, des comètes et de la terre à cause qu'elles la font réfléchir; et en particulier de tous les corps qui sont sur la terre à cause qu'ils sont ou colorés, ou transparents, ou lumineux; et enfin de l'homme, à cause qu'il en est le spectateur.
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> [But just as painters, unable to represent all sides of a solid body equally well on the flat surface of the painting, choose one of the principal sides to set facing the light and cast all the others in shadow in order to make them seem only as they would when viewed from the angle of the chosen side, so I, fearing that I could not put all of my thoughts into my discourse, decided to expose fully only what I thought of light. Then, as it became necessary, I added something about the sun and the fixed stars, because almost all light comes from them; about the heavens, because they transmit light; about the planets, the comets, and the earth, because they reflect the light; and especially about all the bodies on the earth, because they are either colored or transparent or luminous; and finally about man, because he is the observer of all of these bodies.] (*Discours*, AT 6:41–42)

I have shown that this passage offers testimony of the interconnections between science and art by evoking the compositional techniques common to both disciplines, the need to evoke the whole by emphasizing the

arrangement of individual parts. Descartes's own analysis is troubling, however, in that what he describes as a science for art—the rules of perspective—has no direct equivalent in the scientist's narrative. Descartes understands that if a painter were to ignore the rules of perspective, the objects he paints would lose their reality effect; the observer would fail to recognize them as they appear in nature. Geometrical precision in painting—the use of mathematics to explain the visual process—appeals to Descartes, we can assume, because his own theories are based on a mathematical model. The assumption in art, as in deductive reasoning, is that a series of inviolable rules determines meaning. Descartes leaves aside how color, shading, and the like may also influence the appearance of things in a painting, as well as the fact that artists do not always fully respect the rules of perspective. He considers linear perspective to be, if not the only way, then one certain way for art to ensure that objects on the two-dimensional plane of the canvas appear in proportion to one another. To achieve this perspective the painter must privilege certain views that, as Descartes notes, distort the real dimensions of the object.

Curiously, in this passage Descartes does not specify that art and science similarly rely on the rules of geometry. Instead he draws an analogy with painting to explain the formal properties of his discourse, a narrative structured over time (diachronically) through a series of paradigms (synchronically). Narrative, however, responds to different criteria from those of geometric perspective in art. Descartes could, in fact, tell the complete story of his discovery of the method (including the parts he has omitted) were he not concerned about censorship. The range of narrative patterns, however, far exceeds those for proper perspective. An author not only selects certain elements, as Descartes champions, but also may elect to respect or distort the actual chronology for greater dramatic effect, may increase or decrease the space accorded a particular element of the story, just as he may manipulate the point of view. The selectivity and display of elements within the narrative thus reflects more an art, the art of persuasion, than a rigorous set of laws governing the material that the author conveys. By concentrating or diluting time, by emphasizing or deemphasizing particular events, the narrative imposes a different order on things. Narrative elements do not simply fall into place, assume a position within the record as so many objective facts that, like a series of numbers, can be reworked from various points of entry always to produce identical results. Rather narrative, like any compositional scheme, any system of classification, represents an implicit or-

ganization of knowledge. The framing of events determines how the reader/viewer perceives them. Yet for science, as we have seen, the frame does not simply melt away once the elements are in place, once the table is set. We recognize the frame as being one of the constituent facts of knowledge, part of the final solution that the analytic method produces. More precisely, it is the part of the solution that causes us to reevaluate the rest.

Descartes's dedication to a fundamental logic is evident in his focus on the underlying mechanical system of all things. In the *Traité de l'homme* [*Treatise on Man*], he invents, reminiscent of his fictive planet in *Le monde,* a human body that is a machine. He compares this invention with clocks, artificial fountains, and mills. But he makes this invention capable of performing a greater variety of movements than the other machines because, he explains, the human body belongs to man, whom God made.[3] What interests Descartes is what, sometimes quite literally, makes these various machines tick, their internal mechanisms. Offering an explanation of an engine, Pascal Dumont demonstrates both the effectiveness and, I argue, the limits of the Cartesian model:

> Ainsi, le *Traité de la mécanique* montre-t-il comment on peut inventer des engins permettant de lever, tirer, tracter, en faisant varier dans une même proportion le poids et la hauteur. Tout le problème y est d'isoler les paramètres à faire varier, négligeant ceux qui ne sont pas essentiels à la compréhension du mécanisme, puis de jouer avec eux, par exemple en substituant à la hauteur verticale un plan incliné.
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> [Thus the *Treatise on Mechanics* shows how one can invent engines that allow one to lift, pull, and drag by causing the weight and the height to change proportionately. The whole problem amounts to isolating the parameters that one wants to vary, ignoring those that are not essential to an understanding of the mechanism, and then playing with them, for example, by substituting an inclined plane for the vertical height.][4]

Descartes's notion that natural objects function like machines influenced what he discovered. He must ignore or explain away any irregularity, anything at variance with his orderly mechanical model. We are moved to wonder, however, what distortions occur as a result of the neglected parameters.[5] By limiting the analysis to a fixed set of rules, Descartes runs the risk of error: he resists information that would expose the limitations of the model he applies; he may ignore viable alternatives.

Yves Belaval situates an important conflict between Leibniz, who tended to see in nature a field of possibilities, and Descartes, for whom nature remained largely stable, governed by a central regulating mechanism.[6] Leibniz believed that by linking elements in a chain of cause-and-effect relations, one eventually realizes the possibility of recombining elements and thereby creating new things. Descartes, by contrast, saw in the possibility of infinite expansion a loss of meaning because this possibility implies a loss of control. He argued that if the mind were to spin out these forms rather than anchor them within fixed parameters, or rules, experience would be channeled forward in such a way that the mind could not truly grasp them. For Descartes, Dumont emphasizes, such a progression signals dissolution:

> La volonté cartésienne de ramener toute œuvre au mécanisme de son fonctionnement procède du refus d'un tel formalisme qui restitue à l'art humain une puissance créatrice capable de combiner les éléments: l'esprit humain y manipule une force qui le dépasse et il voit naître, à travers ses combinaisons, une œuvre qui lui échappe et dont il peut seulement constater l'existence.
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> [The Cartesian will to explain every work in terms of its functioning mechanism comes from the (Descartes's) rejection of a formalism that would restore to human art a creative power capable of combining elements: in this case the human mind manipulates a force that exceeds it, and through these combinations it sees emerge a work that escapes it and whose existence alone it can affirm.][7]

But dissolution is implicit in Descartes's methodical approach. Ironically, an unavoidable loss of concentration occurs not because Descartes has no anchors, no fixed set of variables, but rather because he does. Automatons (machines) are but applications of the basic model of Descartes's theory, which is a logic, an integral system, that works like a frame to hold and guide experience. Descartes processes new data by filtering them into categories already established. Any new patterns that emerge are a function of an "old" belief in order, a preexisting idea of the value of systems. What is filtered out, of course, or filtered in, in ways that distort their true meaning, are identities that are exceptions to the rule, that do not conform. Thus Descartes may simplify a phenomenon enough to identify its base mechanism; he may proceed from this knowledge to construct an order dependent on his logic alone (rather than an

order inherent in nature), but the process inevitably discounts other variables, other possible combinations, that his system cannot tolerate. Memory does orient Descartes's thinking back to a first deduction, as Schouls suggests. Although it grounds his ideas firmly, however, it also limits his science. Most notably in the second application of the method, in his discourse for the record, memory roots the table of identities that the philosopher develops in a past knowledge, an already known. It folds new identities back into and onto old. The rest simply dissolves. Standing in the wake of this erasure, the frame that so efficiently seals in knowledge for Descartes looms even larger before us, another idol/artifice wearing paint.

Does our recognition of the frame structure through which Descartes authenticates identities mean that he or we have lost the path to the truth? Descartes's own example leads us back to art. Poussin's *Jugement de Salomon* [*Judgment of Solomon*] (plate 13) presents a textbook case of the Cartesian model for rational analysis. My purpose here is purely didactic: Poussin helps to illustrate my argument; he does not directly model himself after Descartes. The painting has all the elements that I have been discussing: it celebrates order, reason, and memory by returning to the Bible for inspiration. Poussin evokes a well-known story from 1 *Kings* (3:16–28). Two women, both prostitutes, have recently given birth. When one of the children dies, his mother declares that she is the mother of the other, surviving child. As no one can determine which woman is the real mother, the community appeals to the young King Solomon. Standing before him, each woman affirms that she is the baby's mother. Proof is in scarce supply, and Solomon, in a moment of profound insight, sign of his maturity and wisdom, offers his judgment: "You both declare that you are the mother of this baby. I cannot determine who is telling the truth. So we will cut the child in half and give half to each of you. This is an equitable solution to the problem." He looks intently at the women to see if their reaction offers the missing proof. One of them angrily replies, "If I cannot have the baby, then neither can she!" The other woman, horrified by this proposal, asks Solomon to give the child to her rival. Smiling knowingly, the king pronounces his final judgment, "The true mother loves her son and always puts his well-being above her own. Only one of these women was prepared to give up the child in order to save his life. She is the true mother."

Poussin also made an excellent decision in selecting a story so supportive of monarchic power. Christopher Braider has analyzed how the

painting, in its Euclidean triangulation, reinforces the order of the State, consistent with the monarchic ideals of Poussin's own contemporaries.[8] The king is appropriately poised at its vertical angle, effectively dividing the scene into two symmetrical halves. But which mother is which? The woman on the left has light skin and wears a silk robe whose brightly colored white and blue suggests her purity. We see the child, held by the soldier ready to slay him, through her outstretched arms. This part of the scene takes place to Solomon's right, the side of justice. This woman is obviously the mother. With a decidedly gray cast to her skin, the other mother holds her dead child in her arms. Wearing garments whose muted tones and rougher textures suggest less refinement than do the other woman's clothes, she seems cold, even violent. She conveys nothing maternal in her gesture. Certainly she is the one who prefers half a child to no child at all. Or is it the other way around?[9] If the fact that the soldier holds the child as he draws his sword suggests that Solomon has already announced his intention to sever it, how do we interpret the women's responses? In the Bible the true mother accepts the need to sacrifice her son to preserve his life, whereas the false mother accepts Solomon's decision to divide him. The raised hands of the woman on the left are a plea to stop the killing. The relative calm of her face registers her maternal protection, a certain resignation that her personal loss of the child is better than its death. It is unlikely, however, that both the uplifted hands and the calm expression would occur simultaneously; protest requires a certain energy that this woman's face does not exhibit. We have trouble, moreover, explaining the other woman's rage, if indeed she is the false mother who prefers half a child. Is she instead the good mother who holds the other woman's dead child in her arm out of an excess of maternal sentiment that encourages her to protect, indeed to assuage somehow, the other woman's loss? Does she hold the corpse to signal the other mother's neglect? Does she strike out in panic that the child will actually be put to death? Probably not, we think, given that the light emanating from the left side of the painting and the more fragile beauty of the woman on this side both point to her election as the "good mother."

The only other child in the painting appears on the right among the many witnesses, creating a side for the innocent pleading of the righteous against the sword-drawn soldier in the foreground of the figures on the left, which by extension becomes the side of violence. Solomon, his left forefinger elevated slightly more than his right, appears to side in fa-

vor of those to his left (the viewer's right). But perhaps he raises his finger to caution calm after the spectators burst out in protest following his decision. For all of its specificity, for all of its apparent realism, and for all of its meticulous attention to the symmetry necessary to promote the idea of balance as a prerequisite for judicious deliberations that allow the viewer's direct penetration of the truth—all of these factors notwithstanding—the narrative framework of the painting precludes our knowing with absolute certainty the correct interpretation of the actual judgment as an event in, and not simply a marker of, history.

What appears at first to be a depiction of Solomon's judgment, the single moment of its enactment, is rather the compression of distinct moments of this history into one image. Though it seems to fix a moment in time, the painting actually narrates a sequence of events. Poussin represents iconic scenes of the history of Solomon's judgment rather than the critical episode in which the king pronounces his verdict. The *Jugement de Salomon* therefore offers an interesting model for understanding Descartes. It engages us in the process of deciphering the individual elements, the various components of the painting that, although they work together visually to consolidate information, nevertheless involve a certain narrative sequencing, or parceling of information. While it would be an overstatement to claim that we cannot know which woman has lied and which has told the truth, for the woman on the left is most certainly the good mother, the fact that the figures within the image resist an absolutely synchronous presentation through which to affirm the immutability of Solomon's judgment speaks to tensions that lie at the heart of taxonomic representation. Our interpretation of Poussin's image depends on our knowledge of the history on which it is based, on a collective memory of the biblical text. Poussin encourages us to cast back into memory, to acknowledge the story as it unfolds. Descartes's table of elements has no such memory supporting it, save the order, or frame, that he applies; nothing authorizes meaning except the fable that is his history of the method. If the activity of judging the various components of Poussin's image were to serve as a guide, therefore, then the act of reading Descartes's table in order to access the truth would seem to be greatly compromised. Would a scientific table that isolates a single paradigm of elements in nature, just as Poussin creates a single image of multiple events in a story, allow for absolute clarity concerning the things it contains and all of their possible relations to other things? Absent a clear

narrative, a referent that all readers share, as Poussin's viewers do, could the scientific taxonomy represent the truth about nature?

Poussin's painting deftly celebrates the idea of order, will, and, through its symmetries, the ponderous act of weighing to which all judgments must submit. If in the end we trust our initial impression, namely that the woman on the left is the real mother of the dead child, this understanding does not obscure the fact that many aspects of the painting, upon closer scrutiny, do not quite coalesce. Poussin harnesses time by letting it continue to circulate within the frame of his image. He thus depicts not only a moment in history but also the act of building a monument to history. Such commemoration is a profoundly rational endeavor that depends on the establishment of differences. Yet, since one mother so easily resembles the other, the selection of one term over its opposite appears arbitrary, if ultimately benevolent. The composition establishes binary opposites—good and evil; upper and lower; living and dead; smooth and rough textures—that appear to offer us access to the whole body of knowledge related to this scene. But if we can extract one truth from its opposite, the process of extraction seems . . . not infinite, certainly, but without proper limits. Poussin's argument extends itself even as Solomon appears to bring his to a close. The artist accentuates the flow of meanings, the process of structuring identities, in contrast to Solomon, who in one stroke establishes the mothers' identities once and for all. Translated into the discourse through which Descartes relates his discoveries, the question becomes: How does he select one narrative sequence, one set of variables, from the range of possibilities? How does he restrict the data to knowable categories? How does he prevent slippage from category to category? How does he prevent new interpretations of his interpretations from occurring?

I am suggesting that to convert his data to discourse, to construct the permanent record, Descartes must somehow freeze time, by which I mean establish an original memory or frame structure (axiom) upon which other knowledge will be built. If with Poussin I am denying the purely visual elements of his art to concentrate on a sort of narrative superimposition—before and after—so with Descartes I am denying the purely historical aspect of textual narration. I refer to the underlying formal logic common to both image and text. Needing to relate the specific parts of a complex mechanism, including that of all living entities, Descartes resorts to a precise logic, established principles. Yet the dis-

course that emerges from this application of the method inevitably produces a certain compression or contortion of elements. Any accommodation, any return to a preexisting model—any *préalable*—has the potential of distorting his results.

In part 6 of the *Discours* the philosopher vows to avoid publishing his papers until after his death in order not to waste valuable time debating their validity: "afin que ni les oppositions et controverses, auxquelles ils seraient peut-être sujets, ni même la réputation telle quelle, qu'ils me pourraient acquérir, ne me donnassent aucune occasion de perdre le temps que j'ai dessein d'employer à m'instruire" [so that neither the oppositions and controversies that they might engender nor even the renown that I might acquire through them would ever cause me to lose the time that I planned to devote to educating myself] (*Discours,* AT 6:66). Descartes's ideas are controversial. But even those who would be persuaded by his argument are entitled to question whether his table of knowledge holds ground and whether, on the basis of the method, he can project a certain knowledge into the future in a straight path toward the truth. His idea of not wanting to lose time seems to anchor him in an eternal present. Although he casts an eye toward the future, we feel the tug of time back to the present, back to him as the framer of history.

Consider Descartes's eloquent close to part 6 of the *Discours,* a testimonial to himself and to his research:

> Au reste, je ne veux point parler ici, en particulier, des progrès que j'ai espérance de faire à l'avenir dans les sciences, ni m'engager envers le public d'aucune promesse, que je ne sois pas assuré d'accomplir; mais je dirai seulement que j'ai résolu de n'employer le temps qui me reste à vivre, à autre chose qu'à tâcher d'acquérir quelque connaissance de la nature, qui soit telle qu'on en puisse tirer des règles pour la médecine, plus assurées que celles qu'on a eues jusqu'à présent; et que mon inclination m'éloigne si fort de toute sorte d'autres desseins, principalement de ceux qui ne sauraient être utiles aux uns qu'en nuisant aux autres, que, si quelques occasions me contraignaient de m'y employer, je ne crois point que je fusse capable d'y réussir. De quoi je fais ici une déclaration, que je sais bien ne pouvoir servir à me rendre considérable dans le monde, mais aussi n'ai-je aucune envie de l'être; et je me tiendrai toujours plus obligé à ceux, par la faveur desquels je jouirai sans empêchement de mon loisir, que je ne ferais à ceux qui m'offriraient les plus honorables emplois de la terre.
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> [As for the rest, I do not want to speak in detail here about the progress that I hope to make in the sciences in the future, or to make any promise to the

public that I cannot be sure of fulfilling. Instead I will say simply that I have decided to use the time remaining to me in this life only to try to acquire some knowledge about nature that would allow us to derive rules for medicine that are more certain than those we have at present. And my inclination to do so takes me so far away from all other projects, especially from those that would prove useful to some only by bringing harm to others, that even if some circumstances compelled me to become involved in such pursuits, I do not believe that I would be capable of succeeding in what I undertook. I hereby declare this to be so, knowing full well that it will do nothing to increase my reputation in the world, which, incidentally, I have no desire to build. And I will always consider myself more beholden to those whose favor has allowed me to enjoy my leisure without impediment than I would be to those who would offer me the most honorable positions in the world.] (*Discours,* AT 6:78)

Descartes writes with a modesty that is not quite false, given contemporary rhetorical models for claiming success, yet not quite sincere, given the various ways throughout the *Discours* in which he has promoted not only his science but also his authorship and his unique capacity to distill and disseminate what he has discovered. In Descartes's forward-looking statement we cannot help but hear an elegiac tone: "the time remaining to me in this life." As if speaking directly to posterity via his contemporary readership, he focuses attention on a future perfect even as he refuses to name precisely what matter he will investigate: I *will have* accomplished this or that. This portrait offers a vision of Cartesian time—a look forward that is a look backward, an appeal to memory even as it summons the future. Descartes has created a system through which his ideas coalesce. Yet what slips through the cracks of his exposition, indeed through the cracks of the method, is the realization that any table of elements—any component of any system—can be rearranged, reinterpreted in light of other data, other organizing principles. Not data but rather the narrative that interprets them constitutes a final knowledge. Narrative, however, derives its energy from the mind rather than from nature; we can and do change how we structure a view of what we observe there. Descartes takes great satisfaction in knowing that for the rest of his days there will be no time lost because any expansion of his ideas over the years bears the full weight of the memory, the imprint of the structure that he has created. He thereby affords his science a full extension outward, into the future, perfect. We, however, might classify his memory within the field of dreams.

If we seek out a representation of the plenum of experience, an experience wrought not in dreams of things yet to be discovered but rather in a perfection already achieved, Vermeer provides satisfaction. Capturing a moment suspended in time in *Woman Holding a Balance* (plate 14), Vermeer gratifies not only the eyes hungry for a view of things both recognizable and refined, familiar yet somehow transcendent, but also the mind eager for ideas, open to eternity. He achieves a self-conscious and self-validating symmetry through the painting within the painting, the *Last Judgment,* which, like the full work, is organized around a single object: a balance. Vermeer invites the reader into the real, but an elevated real enhanced by the particular articulation that he gives to the female figure. Gold and pearl jewels appear not as objects simply but as ornaments. Quintessentially feminine and traditionally *inessential* details, the gold and pearls nevertheless convey the work's essential meaning.[10] Though delicately draped across the jewelry box and on the table, these objects offer a presence strong enough to counterbalance the moral weight of the *Last Judgment,* Christ's final determination of human worth. The woman's head conceals Saint Michael as he weighs souls in the scales. She therefore appears to respond directly to Christ; we witness her, rather than Saint Michael, preparing the ultimate act of judgment. The viewer studies her, the jewels she places on the weighing pans, and the delicate gesture through which she balances them with her extended finger. She would know the weight of individual pieces in one pan by comparing them to a known weight in the other, or she would simply determine that one weighs more or less than another based on the rise and fall of the pans. Either way, Vermeer shows a woman engaged, or about to engage, in an act of calculation. Yet the serenity of this image and the beauty of the objects elevate the woman far above the mundane and even further above the venal. She embodies an idea, indeed an ideal of femininity and domesticity, that weighs favorably against the negative associations of jewels with vanity and commerce, on the one hand, and with the transience of human existence, on the other. Vermeer speaks to us of eternity not only through the *Last Judgment,* which marks the end of the time remaining for life on earth, but also through the delicate art of balancing the tensions of the worldly and the spiritual, this life and the afterlife, in an image of exquisite beauty which captures forever the fragility of the moment it represents.

Vermeer informs our notion of the rational order that Descartes theorizes by fixing attention on the act of judgment as it extends threefold

from the balance on the woman's table to that of the saint, from the heights of a materially enriched middle class to the heights of heaven, and beyond the world reasoned and controlled by men and women to the world as God created it. Beyond its theme, however, Vermeer's work demonstrates the principles of logical composition by juxtaposing the mass of the figures with the emptiness of the background to the left, dark with light. He narrates with a keen analytic sense, as a final series of three works best explains. In this last grouping of paintings I include *Woman Holding a Balance* as it prepares *Woman with a Pearl Necklace* (plate 15) and culminates in *The Girl with a Pearl Earring* (plate 16). Once again, the story of the interconnection among the paintings is mine. But three paradigms —the feminine, precious stones, and mirrors—allow us to move seamlessly from one image to the next. Contemplation, the feminine gaze that transfixes, the weight and richness of jewels, and the frame of the mirror work together to suggest a perfectibility in art that no science committed to mathematical absolutes can afford to ignore.

The initial impetus for this series is the mirror in *Woman Holding a Balance* whose frame we see on the left, but whose surface only the woman in blue standing before the table could see, were she looking, which she is not. For all that this painting communicates, via the *Last Judgment,* about the vanity of earthly pursuits, the fact that neither the female figure nor the viewer contemplates her reflection in the glass suggests that the painting is more than a *vanitas.* Wheelock explains that the woman remains untouched by temptation:

> Vermeer has portrayed the woman standing before a table with various jewelry boxes, strands of pearls, and a gold chain. These elements belong to, and are valued within, the temporal world. They are, in a sense, temptations toward material splendor. One should be hesitant to identify the woman, however, as a personification of Vanitas. Pearls have many symbolic meanings, ranging from the purity of the Virgin Mary to the vices of pride and arrogance. The woman, moreover, does not appear tempted by the jewels. She concentrates on the balance in her hand. Her attitude is one of inner peace and serenity. There is no psychological tension that would suggest a conflict between her actions and the implications of the *Last Judgment.*[11]

We also note that Vermeer's concealment of the mirror image has the effect of isolating the woman from worldly concerns, a world of commerce and vain adornment. As it represents a temptation that she avoids, the mirror mediates the image by *virtue* of, and I use the term advisedly,

its obscurity. Secular and sacred forces appear equally matched in the painting, and the mirror offers no clue, no likeness to explain these tensions.

Certainly the symmetry of inserted and master painting appears most perfect in *Woman Holding a Balance* because one can run the full gamut of associations from mortal to divine, commercial to spiritual, finite to infinite. But the painting resonates because this chain of analogies fails in the end to identify the woman, to judge her definitively. Vermeer suspends meaning through juxtapositions that provoke questions for which he provides no clear answers: Is the woman pregnant or simply dressed in a fashion that accentuates the roundness of her belly? Is she preparing to sell, to buy, or to offer as gifts any of the jewels that we see? If so, is the value of the gold and the pearls determined by weight alone, or also in relation to their design, the ways in which they have been fashioned into jewelry by craftsmen? Are we supposed to assume that pearls or gold lie on the weighing pans?[12] Is the woman simply conducting an inventory of her wealth, a self-assessment, as this tally of her possessions supports the painting's other "assessment" theme, that of judgments? Is Vermeer offering moral instruction? We can know none of this with certainty. The painting, however, creates ambiguities without ever descending into a disturbing confusion. Inviting the viewer to follow a chain of associations that flow, with the light from the window, upward from the woman's white cap toward the Christ figure and down along her fur-trimmed jacket toward her hand holding the balance, Vermeer suspends truth just as he suspends the woman's gesture in a moment of contemplation. In place of an ultimate judgment he offers nuances of color and texture, evidence of a consummate art that slips through the frames of window, mirror, and painting set in place to assign all things one final name for eternity.

*Woman with a Pearl Necklace* moves a step deeper into secular life. Although Vermeer once again shows the frame of a mirror without revealing the image reflected in it, we know the image to be that of the woman admiring her pearls with evident pleasure. She obviously delights in the necklace's beauty and in her own appearance once adorned with it. We suspect that her possession of the necklace, its status as a costly item, contributes to her satisfaction. Unlike *Woman Holding a Balance,* the second painting includes no image on the back wall. Vermeer eliminated the map that he had originally painted there. The blank wall concentrates the energy of the painting on the woman as her gaze traverses the space to the

mirror opposite her. Unmediated by any other frame in the painting save that of the window which illumines it, the woman's self-reflexive glance seems to revel in its very economy, in more ways than one. The woman's fur-lined yellow jacket which complements the yellow curtain, like the folds of the fabric on the table, and the light reflected off the Chinese jar are details that create a scene so delicate as to mute any harsh moral prescriptions that one might assign to it. Worldly pursuits may be vain, but the unmistakable appeal of this image mitigates the effects of any religious warnings against the pleasure it depicts. By excluding an image related to God's judgment, this painting allows the reflection that would otherwise reveal only vanity to be a sign of beauty. In the context of a self-regulating space, one that would isolate itself from external judgments, the mirror that sends the woman's image back to her also models the ways in which the artist assigns value to the things in his painting without reference to a constricting moral lesson from the Bible. The objects collected on the table authenticate through their apparent naturalness a middle-class setting in what might be termed a contemporary Dutch morality tale about self-possession through material possessions.

Yet a certain tension pervades this image, a destabilization reflected in the position of the woman off to the far right. Less serene than the woman holding the balance, this woman seems to absorb the energy created by the opposing forces of a kind of clutter of objects, accentuated by the angle of the chair in the foreground, and the unadorned rear wall, whose soft tones register the effects of the light streaming through the window. She is the fulcrum of the painting, its stabilizing force, but the interior over which she presides is, as the light reminds us, not hermetically sealed, perfectly resistant to pervasive moral codes that condemn the pursuit of worldly interests. Moreover, the objects in the painting do not form a chain of associations for interpreting the female figure's admiring gesture with the necklace, although they are all possessions that help to identify her. The jar, the curtain, the cloth, the bowl, and the powder brush on the table do not connect to the pearl necklace as the gold and pearl jewelry, all objects to be weighed, do to the balance that the first woman suspends between her fingers. In *Woman with a Pearl Necklace,* the paradigm of a self-regulating economy does not entirely cohere; the class of accumulated objects does not assure the integrity of the model.

With *The Girl with a Pearl Earring,* Vermeer completely evacuates the moral lesson, the world outside, and adds a subtle dose of exoticism that enables, deep from within the here and now, a transcendence worthy of

any religious text or image. A portrait, this third painting also focuses on a prized object: a magnificent teardrop pearl earring that the young girl wears on her left ear. Despite a realistic style consistent with the other paintings, *The Girl with a Pearl Earring* is evocative, quietly seductive, because the figure appears to exist in her own world. Art, in the form of an exquisitely rendered pearl, and the imaginary take hold.

Vermeer intensifies the feminine presence in several ways. In comparison to the two other paintings, less of the girl's body, from slightly below the shoulder to the top of her head, fills out more of the canvas. Consistent with other portraits of the period, a dark background isolates the girl; Vermeer includes no details of the physical surroundings. He has the girl glance back at us as we look intently at her, captivating us much like Leonardo's Mona Lisa, to whom she is frequently compared. Vermeer's girl wears a turban, a popular accessory that connotes a certain otherness. The large earring captures our gaze because it stands out as a precious object in an otherwise understated portrait. The pearl fascinates because it is a sign of luxury in a composition that emphasizes the girl's modesty, through the head covering, and through her somewhat averted gaze. Moreover, the pearl figures prominently because it reflects the white of the girl's eye, which is exposed to the maximum degree as she looks back to her left. The eye appears all the more engaging through its association with the pearl. But the pearl also dominates because of the sensuality of the girl's lips, which, slightly parted (recalling the oyster from which it emerged), are angled down toward it.

*The Girl with a Pearl Earring* includes no *mise en abyme,* properly speaking. Yet I consider the earring to constitute a work of art within the painting. Standing before this painting in The Hague, I was struck by another view. Somewhere before I had seen the image reflected in the pearl, the dark center band, framed on either side by bands of white. In its basic light play, if in none of its forms and specificity, the pearl mirrors the *View of Delft* (plate 7). My analysis was in no way scientific, verifiable through measurements or historical knowledge other than those of a highly subjective mind's eye. Nevertheless, in an effort to document my impression, I held an enlarged view of the pearl opposite the *View of Delft.* Striking resemblances emerged in the major lines and values of the two images. To judge from my own experience, for the visitor of the Mauritshuis, where *The Girl with a Pearl Earring* and *View of Delft* hang on facing walls, the association proves nothing short of moving. Vermeer

has placed his own art *en abyme*. That is his secret and, for us, a source of great pleasure, a discovery there for the taking.

Reading this painting a bit like van Leeuwenhoek would have read an image in the microscope, but aided instead by a computer, we find it possible to focus on the bands of color, a play of light and dark, in which the girl disappears behind a wall of pixels. If we call up the image of the painting and continue to zoom in, eventually we see only an amorphous collection of colored squares, the computer equivalent of blobs of paint. We have lost the pearl, and know that we have gone too far. The pearl does not resemble the scales in *Woman Holding a Balance,* which microscopic examination has revealed to be empty. We can see the light reflected in the girl's pearl earring, even when magnified. If we minimize the image again to refocus on the full portrait of the girl, the pearl retains its shimmer, and its stratification into three layers or bands of color. In the fable (for there is no hard science here) that I construct, the pearl continues to mirror the *View of Delft*. The inserted painting in *Woman Holding a Balance* and the mirror in *Woman with a Pearl Necklace* have been supplanted in this third painting by the pearl *mise en abyme* that reflects, if not the real *View of Delft,* then certainly Vermeer's genius.

In this perfectly balanced equation of art that reflects self-reflexively on its own potential to identify and interpret the world, art that recognizes its ability to bear witness to its own framing of knowledge, we achieve the perfect perspective for understanding how the seventeenth century ordered a view of the world. It is a perspective, moreover, that affords us a privileged view of Descartes. The philosopher failed to acknowledge that the belief in order was a prejudice which imposed an artificial frame on his thinking. Beginning with this concept and with the idea that relegates perfection and infinity to the divine realm, science seals itself within the camera of the mind, within the act and the art of its self-fashioning, as it proceeds to study the world. Like Vermeer, Descartes shows us his hand as he works, but in a gesture that he never fully registered, so caught up was he in the potential for the mind to claim the world for itself.

There is no truth without representation. Descartes's and Vermeer's framing of knowledge in text and in image, respectively, reminds us that the mind, too, works like a camera. The mind is an enclosed space that isolates certain parts of the whole that we wish to identify. That we proceed and progress in our search for knowledge is not in doubt. We need,

however, to understand that the frames that we build to identify things also mark the limits of our understanding. Vermeer's art demonstrates that even the single identity is subject to many discrete changes once it is paired with another element in representation. Analogy, the mirroring of things that is the simplest of complex systems, proves volatile and therefore resistant to taxonomy. Vermeer shows us that the fluctuation of identities, although it may explain the richness of a work, confounds efforts at classification. We therefore question the efficacy of the theory that promises an absolute truth—a promise that, by the end of the early modern period, had already expressed itself in the unrealizable ambition to produce in many volumes the equivalent of a table of elements of all things in nature in all of their interrelations, a table called the *Encyclopédie.*

Modern neuroscience, philosophy, and psychology, through an intense focus on the brain, offer a new route back to Descartes and Vermeer and the efforts to visualize thought that I have analyzed in this book. The distinguished neurologist Antonio Damasio theorizes that cognition depends on "an essential condition: the ability to display images internally and to order those images in a process called thought." The images that the body produces function through what Damasio calls a "topographically organized representation." He describes the physiological process whereby certain patterns of response, certain images, come together in particular circumstances and are later recalled, constructed "momentarily under the command of acquired *dispositional* [potential] neural patterns elsewhere in the brain."[13] Damasio's notions of topography and patterning suggest a mapping of knowledge consistent with my emphasis on taxonomy. He argues that reasoning is not governed strictly by logical manipulation (a set of rules), as Descartes believed, but depends instead on the functioning of the image within the body. Modern research, however, offers no last word to Descartes's search for truth. Even if science were one day able to elaborate in detail, as with genome sequencing, link by link, how individual corporeal functions produce and regulate individual emotions and ideas, the problem of how to classify these ideas—how to generate, understand, and apply knowledge—would persist.

We no longer subscribe to Descartes's radical division of mind and body. His construction of two separate paradigms for man continues, however, to intrigue us because of what it reveals about the framing of knowledge. Descartes theorized a class of identities having to do with the

mind and another class having to do with the body. Privileging the mind over the body, placing the brain that orders things into patterns over the eye that only sees them, Descartes created a taxonomic model that in turn influenced what he thought, and even what he saw. In my discussion of the camera obscura I noted that in the seventeenth century, an artist need not have used this device to replicate the visual effects that it produces. Just as images generated by the camera obscura allowed artists to begin to see in these terms, so Descartes's break with other scientists, his new framing of categories, influenced what he was able to understand. The method afforded him a starting point for creating and testing hypotheses. As a model for classification, however, the method imposes a frame; it shapes and inevitably distorts ideas by separating out an unseen, unnamed class of things that do not cohere.

Descartes rejected merely probable ideas as false. Yet the mere existence of these probabilities informs us that something else was out there, that some things exceeded the body of knowledge that he was constructing. If, on the one hand, this understanding of an always partial knowledge causes us to lose faith that we will ever find truth, faith in Descartes's *unicity,* it allows us to see, on the other hand, how the multiplicity that surfaces in the wake of this discovery widens our view of seventeenth-century culture. In determining the possibilities for knowledge, it is customary to privilege science over art. Yet science and art both classify experience. Both, moreover, develop forms of representation that produce knowledge through a combined reliance on logical systems and invention. Leveling Descartes's presumptive order of things, the table that we construct by aligning science and art engages seventeenth-century culture as it slips past kings and official politics, past official history and established social codes, into a realm of exploration whose uncertainties continue to speak to us. Prominently situated within this table, the refined elegance of Vermeer's *Woman Holding a Balance* records the proper perspective for weighing, in equal measure, the art of science and the science of art.

# NOTES

## *Preface*

1. William Dietrich, "Meet Your New Central Library," *Seattle Times: Pacific Northwest Magazine*, April 25, 2004, http://seattletimes.nwsource.com/pacificnw/2004/0425/cover.html.

2. Herbert Muschamp, "The Library That Puts on Fishnets and Hits the Disco," *New York Times*, May 16, 2004, sec. 2, 31.

3. All references to Descartes are to the standard edition, *Œuvres de Descartes*, 12 vols., ed. Charles Adam and Paul Tannery; reedited by P. Costabel and B. Rochot (Paris: Vrin/CNRS, 1964–74) (hereafter AT). I have modernized the French citations for the *Discours de la méthode* [*Discourse on the Method*] (hereafter *Discours*) and *La dioptrique* [*Optics*]. Citations from the *Regulae ad directionem ingenii* [*Rules for the Direction of the Mind*] (hereafter *Rules*), the *Meditationes de prima philosophiae* [*Meditations on First Philosophy*] (hereafter *Meditations*), and the *Principia philosophiae* [*Principles of Philosophy*] (hereafter *Principles*) appear only in English.

4. Descartes's Rule 6 clarifies that the simplest natures, which we "can intuit directly and alone, independently of all the others, either through direct experience or through the light that is in us," are few in number. We perceive all the others "only by deducing them from these simplest natures, and this must occur either immediately and directly or rather through two or three or more other different conclusions [inferences]" (*Rules*, AT 10:383).

5. Paul Taylor, *Dutch Flower Painting, 1600–1720* (New Haven: Yale University Press, 1995), 42.

6. The Northern Netherlands (United Provinces) came into being as a political entity following the Union of Utrecht in 1579 and waged a long war for independence from Spain throughout the first half of the seventeenth century. Having established profitable trade routes throughout the world, the new Dutch Republic realized a commercial success that attracted the belligerent attention of European monarchs. New wars with England and France ensued during the third

quarter of the century. Louis XIV invaded the Spanish Netherlands in 1672, the "most traumatic [year] of the Dutch Golden Age," for the overthrow of the Republic seemed imminent (Jonathan I. Israel, *The Dutch Republic: Its Rise, Greatness, and Fall, 1477–1806* [Oxford: Oxford University Press, 1998], 796). Vermeer's works span much of this troubled history (1654–1675).

7. Stephen Jay Gould, "Linnaeus's Luck?" *Natural History* 109.7 (September 2000): http://www.findarticles.com/p/articles/mi_m1134/is_7_109/ai_65132190; rpt. in *I Have Landed* (New York: Harmony Books, 2002), 290.

8. Peter A. Schouls, *Descartes and the Possibility of Science* (Ithaca: Cornell University Press, 2000), 9.

9. Albert Blankert, *Vermeer of Delft* (Oxford: Phaidon, 1978), 43.

10. Arthur K. Wheelock Jr., "Vermeer's Craft and Artistry," in *The Cambridge Companion to Vermeer,* ed. Wayne E. Franits (Cambridge: Cambridge University Press, 2001), 41.

11. For most of his career Vermeer had one patron, Pieter Claesz. van Ruijven, who regularly purchased his paintings. While this arrangement assured Vermeer some financial stability, it also restricted the circulation of his works. See John Michael Montias, *Vermeer and His Milieu: A Web of Social History* (Princeton: Princeton University Press, 1989).

12. For more on Dutch artists' enhanced representations of objects collected within the home, see Mariët Westermann, *Art and Home: Dutch Interiors in the Age of Rembrandt,* Denver Art Museum and the Newark Museum (Zwolle: Waanders, 2001). For more on European collections, see Paula Findlen, *Possessing Nature: Museums, Collecting, and Scientific Culture in Early Modern Italy* (Berkeley: University of California Press, 1994).

13. Simon Schama, *The Embarrassment of Riches: An Interpretation of Dutch Culture in the Golden Age* (New York: Vintage, 1997).

14. Dominique Désirat, "La lumière dans la théorie de la peinture en France, au XVIIe siècle," in *Le siècle de la lumière: 1600–1715,* ed. Christian Biet and Vincent Jullien (Fontenay/Saint-Cloud: ÉNS Éditions, 1997), 293.

15. In 1648 Louis XIV authorized Charles Le Brun, official court painter, to establish a Royal Academy of Painting and Sculpture independent of the powerful heads of the Guild of Saint Luke, effectively separating the artists from the craftsmen.

16. The careers of the three brothers, Antoine, Louis, and Mathieu, spanned the period 1629–1648. See Jacques Thuillier, *Les frères Le Nain* (Paris: Réunion des Musées Nationaux, 1978).

17. Richard Helgerson argues that the rise of Dutch genre painting in the seventeenth century correlates with the need felt by the expanding middle class, concerned that a prince of Orange might claim power following Spain's relinquishment of sovereignty, to gain rights from the monarchy (*Adulterous Alliances: Home, State, and History in Early Modern European Drama and Painting* [Chicago: University

of Chicago Press, 2000], chap. 4). Philip IV of Spain officially recognized the Dutch Republic in 1648, following the Eighty Years' War. Spain, however, had granted some recognition to the United Provinces since 1609, with the Twelve Years' Truce, after which they were led mainly by prominent members of the Dutch Protestant aristocracy and upper middle class.

18. Jean-Jacques Lévèque observes: "Sa nature profonde le porte à préférer le grand langage symbolique aux symboles du moment" [His pensive nature led him to prefer the grand symbolic language over the symbols of the moment] (*Nicolas Poussin: Le poète de la rigueur, 1594–1665* [Paris: ACR Édition, 1994], 147).

19. See Claude Lévi-Strauss, *Le totémisme aujourd'hui* (Paris: PUF, 1962), and *Pensée sauvage* (Paris: Plon, 1962).

20. Carl Linnaeus published the *Systema Naturae: Creationis telluris est gloria Dei ex opere Naturae per Hominem solum* in 1735. In this work Linnaeus offered a model for classifying living things based on a hierarchical or "tree" structure of classification whereby all organisms are arranged according to kingdom, phylum, class, order, family, genus, and species. In the preface to a late edition of this work he observed that the earth is testimony to the glory of God. Linnaeus believed that the study of nature would reveal the divine order of nature, God's creation. The naturalist undertook to construct a "natural classification" that would reveal this order. Gould argues that Linnaeus's hierarchical system happened to express the hierarchical relations built into Darwin's causality, and thus could easily "translate" Darwin's ideas a century later ("Linnaeus's Luck?" 291–95). While Linnaeus's original system has undergone transformations, its extended influence is likewise evident in the recent attention given to taxonomic classification in molecular systematics, a branch of bioinformatics (the merging of biology, computer science, and information technology to form a single discipline) which uses gene sequencing to construct phylogenetic trees. See also Sten Lindroth, "The Two Faces of Linnaeus," in *Linnaeus: The Man and His Work,* ed. Tore Frängsmyr (Berkeley: University of California Press, 1983), 1–62.

21. See Findlen, *Possessing Nature,* 3–9 and 393–94.

22. Antoine Furetière, *Dictionnaire universel, contenant généralement tous les mots français tant vieux que modernes, & les termes de toutes les sciences et les arts . . . recueilli et compilé par feu Messire Antoine Furetière, Abbé de Chalivoy, de l'Académie française,* 3 vols. (La Haye: Arnout et Reinier Leers, 1690).

23. Steven Shapin observes that "no body of culture is able to wholly reject its past. Historical change is not like that, and most 'revolutions' effect less sweeping changes than they advertise or than are advertised for them. Copernicus's new astronomy preserved Aristotle's assumption about the perfection of circular motion, as did William Harvey's (1578–1657) discovery of the circulation of the blood. The very identity and practice of early modern astronomy depended utterly on the observational data compiled by the ancients: there was no way that sixteenth- and seventeenth-century practitioners, however 'revolutionary' mind-

ed, could set aside that legacy. . . . [M]any mechanical philosophers publicly announced their rejection of the old teleology while preserving an important role for explanations in terms of purpose in some of their actual explanatory practices" (*The Scientific Revolution* [Chicago: University of Chicago Press, 1998], 67).

24. Furetière offers a definition of science that refers to the encyclopedia as a compendium of knowledge: "L'Encylopedie est la science universelle" [The encyclopedia is universal science]. Under the entry for "encyclopedia" we find: "Science universelle, recueil ou enchaisnement de toutes les sciences ensemble. C'est une temerité à un homme de vouloir posseder l'*Encyclopedie*" [Universal science, collection of grouping of all the sciences together. A man is very imprudent to want to possess the encyclopedia] (*Dictionnaire universel*). It is that very "temerity," as it encompasses both the sciences and the arts, that I explore in terms of a table of knowledge.

25. In his introduction Pliny claims to cite one hundred authors from two thousand works, yielding twenty thousand individual facts, a conservative estimate according to some scholars, who note that he cites 146 Roman and 327 foreign authors (*Natural History,* trans. John Bostock and Henry T. Riley, vol. 1 [London: G. H. Bohn, 1855]).

26. See Findlen's discussion of Pliny's influence on the encyclopedic model adopted in sixteenth- and seventeenth-century Italy (*Possessing Nature,* 57–78). See also the discussion of medieval and Renaissance and early modern connoisseurship and collections by Lorraine Daston and Katharine Park, *Wonders and the Order of Nature* (New York: Zone Books, 1998), chaps. 4 and 7.

27. Under "opinion," Furetière offers, without reference to Descartes, the very Cartesian notion that "la Geometrie est la seule sçience où il n'y a point de diversité d'opinions parce qu'elle est fondée sur la demonstration" [geometry is the only science where there is no difference of opinion because it is founded on demonstration (proofs)] (*Dictionnaire universel*). Descartes wanted all of his data to reflect the irrefutable conclusions of a geometric paradigm.

28. See especially Francis Bacon, *Novum Organum,* in *The Works of Francis Bacon,* ed. James Spedding, Robert L. Ellis, and Douglas D. Heath, vol. 4 (London: Longman, 1857–74; rpt. New York: Garrett Press, 1968).

29. "Nous déclarons ici que nous devons principalement au chancelier Bacon l'arbre encyclopédique dont nous avons déjà parlé fort au long, et que l'on trouvera à la fin de ce discours. Nous en avions fait l'aveu en plusieurs endroits du *prospectus*; nous y revenons encore, et nous ne manquerons aucune occasion de le répéter" [We state here that we owe the encyclopedic tree, which we have already mentioned, and which can be found at the end of this Discourse, primarily to Chancellor Bacon. We have acknowledged this source at various points in the Prospectus and return to it here, and we will miss no opportunity to repeat it] (Jean Le Rond d'Alembert, "Discours préliminaire de l'*Encyclopédie,*" in *En-*

*cyclopédie ou Dictionnaire raisonné des sciences, des arts et des métiers,* ed. Denis Diderot and Jean Le Rond d'Alembert, vol. 1 [Paris: BNF, 1997], 25, http://visualiseur.bnf.fr/Visualiseur?Destination=Gallica&O=NUMM-87305).

30. Schouls notes that while there exist many different methods that scientists have adapted to meet the needs of their particular subject of research, Descartes considers his method fundamental for science, a requisite for all discoveries, because it offers "the functional definition of reason" and therefore can and should "be applied to any area where we can expect to find knowledge and develop science" (*Descartes and the Possibility of Science,* 65).

31. See ibid., 80–85.

32. Harriet Stone, *The Classical Model: Literature and Knowledge in Seventeenth-Century France* (Ithaca: Cornell University Press, 1996).

33. Michel Foucault explains that in the classical period, knowledge of an object depends not on its formal reality but rather on the mind's abstract representation of it. The determination of a particular identity results from one's ability to order and measure it in relation to other things that one similarly conceives (*Les mots et les choses: Une archéologie des sciences humaines* [Paris: Gallimard, 1966]). Although the latter "language" is, as Foucault explains, highly systematic, I argue that classification remains problematic.

34. Ibid., 89. See also Timothy J. Reiss, *The Discourse of Modernism* (Ithaca: Cornell University Press, 1982), and *Knowledge, Discovery, and Imagination in Early Modern Europe: The Rise of Aesthetic Rationalism* (Cambridge: Cambridge University Press, 1997).

35. See Schouls, *Descartes and the Possibility of Science,* 86.

36. For more on the organization of the *Encyclopédie,* see Robert Darnton, *The Great Cat Massacre and Other Episodes in French Cultural History* (New York: Basic Books, 1999), chap. 5.

37. D'Alembert, "Discours préliminaire," 1.

38. Ibid., 12.

39. Ibid.

40. Denis Diderot, "Bas," in *Encyclopédie ou Dictionnaire raisonné des sciences, des arts et des métiers,* ed. Denis Diderot and Jean Le Rond d'Alembert, vol. 2 (Paris: BNF, 1995), 98, http://visualiseur.bnf.fr/Visualiseur?Destination=Gallica&O=NUMM-50534; and *Encyclopédie ou Dictionnaire raisonné des sciences, des arts et des métiers, par une société de gens de lettres,* ed. Denis Diderot and Jean Le Rond d'Alembert, in *Œuvres complètes,* ed. Herbert Dieckmann, Jacques Proust, and Jean Varloot, 33 vols. (Paris: Hermann, 1975–), 6:76–77.

41. See Jacques Proust, "Diderot et le système des connaissances humaines," *Studies on Voltaire and the Eighteenth Century* 256 (1988): 117–27; and Stone, *The Classical Model,* 216–17.

## *Introduction*

1. Following Galileo's second condemnation in 1633, Descartes had decided against publishing *Le monde,* which he summarizes in part 5 of the *Discours.*

2. Victor I. Stoichita, *L'instauration du tableau: Métapeinture à l'aube des temps modernes* (Geneva: Droz, 1999), 208.

3. Lucien Dällenbach, *Le récit spéculaire: Essai sur la mise en abyme* (Paris: Seuil, 1977), 18.

4. See Jean-Luc Nancy, *Ego sum* (Paris: Flammarion, 1979); Dalia Judovitz, *Subjectivity and Representation in Descartes: The Origins of Modernity* (Cambridge: Cambridge University Press, 1988); John D. Lyons, *Exemplum: The Rhetoric of Example in Early Modern France and Italy* (Princeton: Princeton University Press, 1989); and Jean-Pierre Cavaillé, *Descartes: La fable du monde* (Paris: Vrin, 1991), for analyses of representation and autobiography in the *Discours.*

5. See Schouls, *Descartes and the Possibility of Science,* for an illuminating analysis of the critical role of the intellectual imagination in Descartes's science.

6. Arthur K. Wheelock Jr. discusses the importance of pendants in Vermeer's work (*Vermeer and the Art of Painting* [New Haven: Yale University Press, 1995], 114). Walter Liedtke argues that the provenance of these paintings suggests that they were commissioned portraits or portraits intended for a scientist or connoisseur with interests similar to those of van Leeuwenhoek, with whom the figures in the painting have been linked "implausibly" ("Genre Painting in Delft after 1650: De Hooch and Vermeer," in *Vermeer and the Delft School,* ed. Walter Liedtke, Michiel C. Plomp, and Axel Rüger [New York: Metropolitan Museum of Art; New Haven: Yale University Press, 2001], 167).

7. See Christian Biet and Vincent Jullien, eds., *Le siècle de la lumière: 1600–1715* (Fontenay/Saint-Cloud: ÉNS Éditions, 1997).

8. Klaas van Berkel identifies in *The Astronomer* an exact replica of the celestial globe that Amsterdam globe and mapmaker Jodocus Hondius offered for sale in 1618 ("Vermeer and the Representation of Science," in *The Cambridge Companion to Vermeer,* ed. Wayne E. Franits [Cambridge: Cambridge University Press, 2001], 131). Van Berkel also identifies the book on the table, open to a page showing a geometrical figure with applications to astronomy, as the second edition of Adriaan Metius's *Institutes of Astronomical Geography,* published in 1621. Noting the absence of the telescope that "was part of the standard equipment of every astronomer," van Berkel concludes that "Vermeer shows us an idealized picture of the astronomer/philosopher reflecting on the cosmos with the help of a book and some instruments; someone who not only calculates and describes but also reflects and contemplates" (138).

9. Bryan Jay Wolf affirms: "The significance of looking through a window, as opposed to being out on the street, is that the . . . window mediates what one sees; it gives the viewer not only the world outside, a drama of 'hats and coats,'

but an awareness of that world as seen through a frame. To stand outside, to be a passerby on the street, is to fall into the trap of ordinary language; it is to mistake hats and coats for real men. Those inside the room possess a different perspective. They see the window as well as the world beyond it, and in the process, they attend not only to *what* they see, but to the terms of their seeing (the mediation of the window)" (*Vermeer and the Invention of Seeing* [Chicago: University of Chicago Press, 2001], 102–3).

10. For an analysis of the different "I" 's of the *Discours,* see Sylvie Romanowski, *L'illusion chez Descartes: La structure du discours cartésien* (Paris: Klincksieck, 1974).

11. Jonathan Crary offers an interesting discussion of these studios as cameras that perform the same operation as the camera obscura (*Techniques of the Observer: On Vision and Modernity in the Nineteenth Century* [Cambridge: MIT Press, 1999], 43–39). See also Wolf, *Vermeer and the Invention of Seeing,* 118–19.

12. Arthur Wheelock has suggested that maps unrolled on the table and rolled on the floor, as well as the sea chart on the wall, signify the quest for "the proper guidance and careful calculation . . . to chart the proper course in life" (*Jan Vermeer* [New York: Abrams, 1981), 138).

13. Liedtke notes that Vermeer's contemporaries occasionally referred to the "infant sailor" Moses as "the oldest geographer" ("Genre Painting," 167).

14. John Loughman and John Michael Montias observe that that "the Dutch approach to picture hanging in the seventeenth century . . . might suggest that most people in the Dutch Republic, with their expanded purchasing power, regarded paintings as decorative props, as a way of filling an empty void on the wall" (*Public and Private Spaces: Works of Art in Seventeenth-Century Dutch Houses* [Zwolle: Waanders, 2000], 50). The authors further indicate to what extent other works, particularly family portraits, reflected a greater emotional attachment. The many genre paintings depicting Dutch interiors, and especially those with inserted paintings of other genre scenes, however, suggest that such works do far more than take up space.

15. Noting the Dutch artists' emancipation from medieval art that inventoried the world based on the assumption of a preexistent order, Tzvetan Todorov recalls André Malraux's observation that "la Hollande n'inventait pas de poser un poisson sur un plat, mais de n'en plus faire la nourriture des apôtres" [Holland was not the first to place a fish on a dish, but rather the first no longer to make it the food of the apostles] (*Les voix du silence* [Paris: Gallimard, 1951]; quoted in Tzvetan Todorov, *Éloge du quotidien: Essai sur la peinture hollandaise du XVIIe siècle* [Paris: Seuil, 1997], 11).

16. Stoichita, *L'instauration du tableau,* 215.

17. Schama, *Embarrassment of Riches,* 323. See also Israel, *The Dutch Republic.*

18. See Schouls, *Descartes and the Possibility of Science,* chap.3.

19. Cf. Stephen Jay Gould's discussion of Bacon's "idols," mental barriers to

knowledge that extend from the "abstract logic of Aristotelian reason and into our interior world of fears, hopes, needs, feelings, and the structural limits of mental machinery" ("Bacon, Brought Home," *Natural History* 108.5 [June 1999]: http://www.findarticles.com/p/articles/mi_m1134/is_5_108/ai_54830693).

20. See Descartes, *Rules,* AT 10:374.

21. Ibid., 374.

22. In his sixth Meditation, Descartes distinguishes the *res cogitans,* the consciousness or the mind ("je suis seulement une chose qui pense" [I am only a thing that thinks]) from the *res extensa,* matter or the body as it exists in time and space.

23. Eddy de Jongh, "Realism and Seeming Realism in Seventeenth-Century Dutch Painting," in *Looking at Seventeenth-Century Dutch Art: Realism Reconsidered,* ed. Wayne Franits, trans. Kist Kilian Communications (Cambridge: Cambridge University Press, 1997), 21–56; rpt. of "Realisme en schijnrealisme in de Hollandse schilderkunst van de zeventiende eeuw," in *Rembrandt en zijn tijd* (Brussels: Paleis voor Schone Kunsten, 1971), 143–94. Franits confirms that painters returned frequently to a limited number of styles, motifs, and themes (*Dutch Seventeenth-Century Genre Painting: Its Stylistic and Thematic Evolution* [New Haven: Yale University Press, 2004]).

24. Mariët Westermann, *A Worldly Art: The Dutch Republic, 1585–1718* (New York: Abrams, 1996), 56.

25. Svetlana Alpers, *The Art of Describing: Dutch Art in the Seventeenth Century* (Chicago: University of Chicago Press, 1983).

## *1. Objects on Display*

1. Michael North explains changes that resulted from the rise of the middle class: "The Dutch no longer defined their social position by enumerating the privileges conferred on them by birth but instead by their mercantile status" (*Art and Commerce in the Dutch Golden Age,* trans. Catherine Hill [New Haven: Yale University Press, 1997], 43). Paul Zumthor underscores four factors that explain how the prosperity of the merchant class affected the organization of Dutch society (*Daily Life in Rembrandt's Holland,* trans. Simon Watson Taylor [Stanford: Stanford University Press, 1994]). He notes that the middle class filled a void left by the *Stadtholder,* who enjoyed no real political power, and was "an arbiter (within strict limits) rather than a depository of sovereignty" (230). Although the Dutch nobility "cherished the memory of its ancient rights," it no longer expected to benefit from them, and for all intents and purposes had become part of the middle class (232). There emerged a class of "patricians," wealthy burghers who concentrated "all effective political power in their hands" (232). Largely devoid of political responsibilities, the other burghers devoted themselves to commerce (235).

2. For more on the spatial relations of Dutch painting, see Martha Hollander, *An Entrance for the Eyes: Space and Meaning in Seventeenth-Century Dutch Art* (Berkeley: University of California Press, 2002).

3. Loughman and Montias, *Public and Private Spaces,* 16. The authors refer to the work of the historian of decorative arts C. Willemijn Fock.

4. I refer to Roland Barthes, "L'effet de réel," *Communications* 11 (1968), 84–89. For the reality effect in Dutch painting, see Eddy de Jongh, "Realism and Seeming Realism in Seventeenth-Century Dutch Painting," in Franits, *Looking at Seventeenth-Century Dutch Art,* 21–56, and his "Pearls of Virtue and Pearls of Vice," *Simiolus* 8.2 (1975–76): 69–97.

5. Wayne E. Franits, *Paragons of Virtue: Women and Domesticity in Seventeenth-Century Dutch Art* (Cambridge: Cambridge University Press, 1995), 66. See also Klaske Muizelaar and Derek Phillips, *Picturing Men and Women in the Dutch Golden Age: Paintings and People in Historical Perspective* (New Haven: Yale University Press, 2003); and Mariët Westermann, *Johannes Vermeer (1632–1674)* (Zwolle: Waanders; Amsterdam: Rijksmuseum, 2005).

6. Schama, *Embarrassment of Riches,* 189.

7. Loughman and Montias are describing the "patriotic room" of the Dordrecht doctor Eduward van Nieuwenhoven in 1670 (*Public and Private Spaces,* 47). Many artists treated the *Roman Charity* theme. See fig. 5 by van Baburen (chapter 3).

8. See Wolf's discussion of the natural and unnatural in this and other paintings (*Vermeer and the Invention of Seeing,* 95–100). Franits calls attention to the thinly disguised titillation in another work by van Mieris, *Teasing the Pet* (1660, Mauritshuis, The Hague): "Suitors who long to be the focus of their ladies' affections . . . are also central to several rather humorous paintings that show men enviously teasing tiny, playful dogs who have the good fortune to be seated in their mistresses' laps. In one by Frans van Mieris the Elder . . . a man pulls on the ear of a puppy in a woman's lap as she simultaneously attempts to push him away. Some have suggested that this gesture signifies her efforts to preserve her chastity against the onslaughts of a tempter. However, this interpretation seems inconsistent with the playful appearance of the scene" (*Paragons of Virtue,* 54–55).

9. Philip Steadman notes that scientists and artists would have known how to manipulate the aperture and depth of field to achieve the desired result: "There is not the same need in a camera obscura, as there is with a photographic camera, to have the whole of the image in perfect focus all at one moment. The focus can be adjusted slightly in order to sharpen up different parts of the image corresponding to objects at different depths in the scene. This can be done with relative ease from inside the camera—for example by having the lens mounted in a tube that can slide backward or forward through a circular opening. (It is possible that Kepler's tent camera had its lens in the tubular 'perspective trunk' for just this reason.)" (*Vermeer's Camera: Uncovering the Truth behind the Masterpieces* [Oxford: Oxford University Press, 2001], 17).

10. Whether a given artist, such as Vermeer, actually used lenses is a matter of critical debate. I return later on to his purported use of the camera obscura.

11. Certainly, painting (or visual traditions) can influence the way one views the world, just as the reverse is true.

12. For more on the relation of optics to Dutch painting, see Martin Kemp, *The Science of Art: Optical Themes in Western Art from Brunelleschi to Seurat* (New Haven: Yale University Press, 1990), 108–19; and Robert D. Huerta, *Giants of Delft. Johannes Vermeer and the Natural Philosophers: The Parallel Search for Knowledge during the Age of Discovery* (Lewisburg, Pa.: Bucknell University Press; London: Associated University Presses, 2003).

13. In a later essay in which she further defends her notion of the pictorial mode, Svetlana Alpers argues: "The phrase 'the art of describing' does not claim that pictures picture the world as it is but rather the world as it is seen, microscoped, mapped, crafted, in short as it is represented. The argument is that pictures are an attempt to make sense (by which I mean produce understanding) rather than a meaning of the world" ("Picturing Dutch Culture," in Franits, *Looking at Seventeenth-Century Dutch Art,* 60). Although her distinction between *understanding* and *meaning* remains obscure, she apparently intends us to appreciate a heightened visual experience that is meaningful (whose meaning resides with the visual experience itself) without being rational, a product of intellection. I submit, however, that painters not only "make paintings," as Alpers contends, but also "make choices" that produce particular visual effects *and* particular meanings.

14. Our fascination with the eye as a mirror of the world persists, though with new attention to the cornea. Columbia University scientists Shree K. Nayar and Ko Nishino have developed a computer-based format for reading the eye, recovering wide-angle views of what people are looking at, including panoramic details to the left, right, and even slightly behind them. It can also calculate where the subject's gaze is turned. See Anne Eisenberg, "Fleeting Experience, Mirrored in Your Eyes," *New York Times,* July 29, 2004, E8.

15. Alpers, *Art of Describing,* 44.

16. Alpers's argument is specific to the Dutch and, some have said, nationalistic. Yet no less a figure than Rembrandt fails to conform to her model, as she acknowledges (ibid., 224). During the Renaissance, moreover, the Italians had their own brand of realism. Artists imitated the most beautiful aspects of nature, deliberately distorting the real to capture the Platonic Ideal. Giorgio Vasari nevertheless expressed "greater regard for real appearances" and for artists who "make their landscapes more realistic, along with the trees, the grass, the flowers, the air, and the other phenomena of nature" (*Lives of the Artists,* trans. George Bull, vol. 1 [London: Penguin, 1965], 93). Vasari praised both Leonardo and Raphael for their ability to imitate nature exactly, to execute compelling likenesses (266, 304).

17. Alpers, *Art of Describing,* 35. Kepler understood the mechanics of visions as follows: The object emits rays in straight lines in all directions. From these rays a small cone is formed in the eye; the cone is refracted and transformed into another cone whose vertex is located on the retina, which becomes stimulated at a point. From this point signals start along the optic nerve, reaching the mind (brain), which registers that in a certain direction at a certain distance lies an object that the observer then asserts that he "sees" (Vasco Ronchi, "Optics and Vision," in *New Dictionary of the History of Ideas,* vol. 3, ed. Maryanne Cline Horowitz [New York: Charles Scribner's, 2004], 412; http://etext.lib.virginia.edu/cgi-local/DHI/dhi .cgi?id=dv3–51).

18. Alpers, *Art of Describing,* 34–35.

19. Ibid., 36–37.

20. Ibid., 35.

21. Ibid., 27. In many instances the perspective shifts to a figure inside the image. Alpers cites the example of Saenredam's paintings of churches which present "not the frame and an externally posited viewer, but rather what was seen by the viewer or viewing eye within the image" (52).

22. Ibid., 27.

23. Steadman presents a 2001 photograph that reproduces Vermeer's view of Delft (*Vermeer's Camera,* 149).

24. Wheelock, *Jan Vermeer,* 94.

25. Israel specifies: "The population of the principal cities rose during the period 1647–72 at an impressive pace. The catastrophic effects of the [French] invasion of 1672 then abruptly reversed this trend so that these cities then fell back markedly, in every respect, between 1672 and around 1678. However, this did not mark the end of urbanization in the Dutch Golden Age. For a general economic recovery ensued which gained momentum in the mid-1680s and which brought the chief Dutch urban centres back to, or more likely slightly above, the levels of population attained by 1672. Final, long-term decline of the Dutch cities, deurbanization in the Republic, commenced only with the resumption of general warfare in 1688" (*Dutch Republic,* 620). Delft's population rose from 21,000 in 1647 to only 24,000 in 1672, as compared to that of Amsterdam, which rose from 140,000 to 200,000 in the same period, and The Hague, which rose from 18,000 to 30,000 (621).

26. Alpers, *Art of Describing,* 41. Alberti defines a painting as a framed surface, or a plane placed at a certain distance from a viewer, who looks through it onto a substitute world.

27. Pascal Dumont, *Descartes et l'esthétique: L'art d'émerveiller* (Paris: PUF, 1997), 88.

28. Ibid.

29. Underscoring another kind of acquisition, or (re)appropriation, Helgerson argues that the male householder, though generally absent from genre paintings,

"nevertheless served as its primary spectator. He, after all, was the person for whom the paintings were made, the person by whom they were most often bought and hung. In the genre paintings of the 1650s and 1660s, men were invited to see their own homes and, by metaphoric extension, their own homeland from the outside. They were peering into an intimate setting that belonged to them but from which they had been at least temporarily excluded" (*Adulterous Alliances,* 86).

30. I refer here to Foucault: "Lorsque la *Logique de Port-Royal* disait qu'un signe pouvait être inhérent à ce qu'il désigne ou séparé de lui, elle montrait que le signe, à l'âge classique, n'est plus chargé de rendre le monde proche de soi et inhérent à ses propres formes, mais au contraire de l'étaler, de le juxtaposer selon une surface indéfiniment ouverte, et de poursuivre à partir de lui le déploiement sans terme des substituts dans lesquels on le pense. Et c'est par là qu'on l'offre à la fois à l'analyse et à la combinatoire, qu'on le rend, de bout en bout, ordonnable" [When the *Logique de Port-Royal* stated that a sign could be inherent in what it designates or separate from it, it showed that in the classical age the sign is no longer charged with keeping the world close to itself and inherent in its own forms, but, on the contrary, with displaying the world, juxtaposing it over an indefinitely open surface, and thereby setting in motion the endless substitutions through which we conceive it. In this way the world is offered up both to analysis and to combination, and can be ordered from one end to the other] (*Mots et les choses,* 75).

31. Axel Rüger, "Balthasar van der Ast," in Liedtke, Plomp, and Rüger, *Vermeer and the Delft School,* 216. See Paul Taylor, *Dutch Flower Painting,* 15–16.

32. Rüger refers to the exorbitant cost of flowers: "During the 'tulipomania' of 1636–37, when out-of-control speculation sent prices for tulip bulbs on the Dutch market skyrocketing, bulbs of the red-and-white striated or flamed tulip *Semper Augustus,*" seen in van der Ast's *Flowers in a Vase with Shells and Insects* (1630, private collection, London), "could cost as much as 13,000 guilders. The yearly earnings of a master carpenter, by comparison, would have been about a third of that sum" (ibid.). Cf. note 37.

33. See Arie Wallert, ed., *Still Lifes: Techniques and Style. An Examination of Paintings from the Rijksmuseum* (Amsterdam: Rijksmuseum, 1999), 53.

34. Ibid., 25–26.

35. Ibid., 25.

36. Schama, *Embarrassment of Riches,* 366.

37. Taylor observes: "Tulips came in several varieties. There were the simple 'breeder' tulips in single colours, which were relatively cheap. 'Flamed' tulips, those with stripes, were the most prized blooms, and different colours were ranked in a hierarchy. At the bottom were 'bizarres,' yellow tulips with red and/or violet flames. Above these were placed white tulips flamed with purple. The pinnacle of desirability was a white tulip flamed in red, and the emperor of

tulips, the 'Semper Augustus,' was deemed the finest example of this kind. At the height of the tulipomania, one of these extremely rare bulbs was valued at 13,000 guilders. To give an idea of the size of this sum to contemporaries: one man, in an anti-tulip pamphlet of 1636, worked out that with 2,500 guilders one could, at that time, buy twenty-seven tons of wheat, fifty tons of rye, four fat oxen, eight fat pigs, twelve fat sheep, two hogsheads of wine, four tuns of beer, two tons of butter, three tons of cheese, a bed with linen, a wardrobe of clothes and a silver beaker" (*Dutch Flower Painting,* 10). See also Schama, *Embarrassment of Riches,* 350–66.

38. Opportunities for encountering rare flowers, like those for viewing paintings in private homes, were not the same for all classes. Nevertheless, one needs only to imagine tea served in the garden by servants to realize how members of all classes became viewers of collections.

39. Lorraine J. Daston, "Classifications of Knowledge in the Age of Louis XIV," in *Sun King: The Ascendancy of French Culture during the Reign of Louis XIV,* ed. David Lee Rubin (Washington, D.C.: Folger Books, 1992), 207–20.

40. Lawrence Gowing, *Vermeer* (London: Farber, 1970), 23; cited in Alpers, *Art of Describing,* 37.

41. Alpers, *Art of Describing,* 36–37.

42. Louis Marin, "Éloge de l'apparence," in *De la représentation* (Paris: Seuil/Gallimard, 1994), 241. Marin refers to Descartes's experiment with the "dead eye" of an animal. See fig. 3.

43. Alpers, *Art of Describing,* 37.

44. Marin, "Éloge," 245, citing Blaise Pascal, *Pensées,* in *Œuvres complètes,* ed. L. Lafuma (Paris: Seuil, 1963), 65–111.

45. Marin, "Éloge," 248.

46. Marin argues that Pascal entirely rejects Albertian perspective (ibid., 245).

47. Foucault, *Mots et les choses,* 148–49.

48. See Todorov, *Éloge du quotidien,* 45.

49. See Wallert, *Still Lifes,* 25–37, for a discussion of still life sources.

50. If the owner of the painting were also, as was common, the owner of the cabinet, he might know much more about the provenance of the fossil and its place in natural history. Either way, by commissioning the painting to display the contents of his collection, the owner imbues himself with additional status. For more on collectors' cabinets, see Antoine Schnapper, *Le géant, la licorne, la tulipe: Collections françaises au XVIIe siècle* (Paris: Flammarion, 1988); Arthur K. Wheelock Jr., *A Collector's Cabinet* (Washington, D.C.: National Gallery of Art, 1998); and Findlen, *Possessing Nature,* chap. 1.

51. Kemp notes: "The basic phenomenon of light through apertures first received sustained attention from Alhazen and his followers in the Middle Ages. They were interested not for purposes of artistic representation but [for] what the phenomenon told them about the behaviour of light" (*Science of Art,* 189).

52. See especially Alpers, *Art of Describing,* 27–33. Alpers refers to Daniel Fink, "Vermeer's Use of the Camera Obscura: A Comparative Study," *Art Bulletin* 53 (1971): 493–505; and Arthur K. Wheelock Jr., *Perspective, Optics, and Delft Artists around 1650* (New York: Garland, 1977), 185–95. Wheelock, *Vermeer and the Art of Painting,* makes frequent reference to Vermeer's probable use of the camera obscura. In the most elaborate treatment of the subject, which includes computer-generated reconstructions of Vermeer's rooms, Steadman (*Vermeer's Camera*) makes a compelling case for Vermeer's adoption of the device. In a 2001 exhibition catalog Walter Liedtke argues that there is "virtually no evidence" to support claims that the Delft artists used the camera obscura to obtain the most realistic scenes possible ("Delft Painting 'In Perspective': Carel Fabritius, Leonaert Bramer, and the Architectural and Townscape Painters from about 1650 Onward," in Liedtke, Plomp, and Rüger, *Vermeer and the Delft School,* 125. Acknowledging Vermeer's fascination with "how things actually appear," Liedtke goes on to sound a cautionary note: "To suggest that these enthusiasms reflect some sort of philosophy or reveal an interest in optics comparable with Descartes's is to drop a lot of baggage at doorsteps in Delft. The 'optical' effects in the pictures . . . may have implied a little learning but were intended mainly as virtuoso displays of artifice, a way of amusing the mind while deceiving the eye" (125).

53. Crary points to Alpers's surprising failure to mention Descartes's work on optics: "Alpers's omission of Descartes's account of vision and the camera obscura in *La dioptrique* (1637) is notable, given that Descartes lived in Holland for over twenty years from 1628 to 1649, and that his optical theory was so closely related to Kepler's" (*Techniques of the Observer,* 35n16).

54. Ibid., 43.

55. Ibid., 46. Crary refers in a note to the analysis of affinities between Descartes and Vermeer by Michel Serres, "L'ambroisie et l'or," in *Hermès III: La traduction* (Paris: Minuit, 1974), 189–96. Serres links the role of geometry in Descartes's philosophy to the spatial organization of four quadrants in Vermeer's *Woman Holding a Balance* (plate 14).

56. Crary, *Techniques of the Observer,* 48.

57. I thank Paul Crenshaw for this information.

58. See Descartes's third Meditation.

59. Ferdinand Alquié, ed., *Œuvres philosophiques de Descartes: 1618–1637,* vol. 1 (Paris: Garnier, 1988), 692n1. Descartes refers to this example in Discourse 6 of *La dioptrique*. See also A. C. Crombie, "Expectation, Modeling, and Assent in the History of Optics. II: Kepler and Descartes, *Studies in the History of Philosophy of Science* 22.1 (1991): 89–115.

60. Stoichita, *Instauration du tableau,* 212.

61. Daniel Arasse, *L'ambition de Vermeer* (Paris: Adam Biro, 2001), 14.

62. See Lyons, *Exemplum,* chap. 4.

## 2. *Inset Genesis*

1. The Catholic Church placed Descartes's *Meditations* on the index of forbidden books. For an account of Descartes's explanation of the Eucharist, see Richard A. Watson, *The Breakdown of Cartesian Metaphysics* (Atlantic Highlands, N.J.: Humanities Press International, 1987), 156–61.

2. Watson (ibid., 16) notes that it is impossible to determine whether Descartes was a devout Christian.

3. Étienne Gilson, ed., *Discours de la méthode,* by René Descartes (Paris: Vrin, 1987), 383.

4. Gilson further notes that Descartes avoids treating the real origin of the world: "Descartes n'a présenté le récit du *Monde* que comme une Fable feinte à plaisir et dépourvue de toute prétention à l'historicité; elle rend intelligible la nature du monde réel, elle ne raconte pas quelle fut sa véritable origine" [Descartes only presented his narrative of *The World* as a fable that he deliberately invoked with no claim to historical veracity. This fable makes the nature of the real world understandable; it does not recount what its true origin was] (ibid., 391). Gilson contrasts Descartes's position in the *Discours* with his later account in the *Principles,* where he affirms that God created the world from the beginning to be as perfect as it is now.

5. Ibid., 380.

6. Ibid., 390–91.

7. For an analysis of geometry in Descartes's theory, see Claudia Brodsky Lacour, *Lines of Thought: Discourse, Architectonics, and the Origin of Modern Philosophy* (Durham: Duke University Press, 1996).

8. Schouls, *Descartes and the Possibility of Science,* 2.

9. Ibid., 75.

10. See also Jean-Luc Nancy, *Ego Sum* (Paris: Aubier Flammarion, 1979); and Jean-Pierre Cavaillé, *Descartes: La fable du monde* (Paris: Vrin, 1991).

11. Christopher Braider, *Refiguring the Real: Picture and Modernity in Word and Image, 1400–1700* (Princeton: Princeton University Press, 1993), 192.

12. Ibid., 192–93.

13. Foucault, *Mots et les choses,* 19–31.

14. Alternate narratives have the royal couple observe the painter as he executes a portrait of the Infanta; mark the moment of the royal couple's preparations to exit the room through the rear doorway, whose curtain the marshal, commonly believed to be José de Nieto, chief servant to the queen, holds open for them; or have the sovereigns entirely absent from the scene. The last interpretation, however, seems unlikely, since six of the members of the royal entourage look into the space in front of the painting, thereby assigning it importance commensurate with the king's presence. See Jonathan Brown, *Velázquez: Painter and*

*Courtier* (New Haven: Yale University Press, 1986), 259–60; and Kemp, *Science of Art*, 107–8.

15. On the basis of inventories of the king's collections, historians have identified many of the paintings as those that decorated the royal apartments in Madrid. The larger works on the far wall are copies by Velázquez's son-in-law Martinez del Mazo of paintings based on Ovid's *Metamorphoses* that Philip IV had commissioned Rubens to make. A copy of Rubens's *Minerva Punishing Arachne* hangs behind the painter's head. A copy of de Jordaens's *Apollo and Marsyas* is also visible. See André Chastel, *Fables, formes, figures*, vol. 2 (Paris: Flammarion, 2000), 145; and Linda Seidel, *Jan van Eyck's "Arnolfini Portrait": Stories of an Icon* (Cambridge: Cambridge University Press, 1993), 190–91.

16. Foucault, *Mots et les choses*, 23.

17. Joel Snyder and Ted Cohen demonstrate through geometric measurements that the mirror reflects the image on the central portion of the canvas ("Reflexions on *Las Meninas*: Paradox Lost," *Critical Inquiry* 7 [winter 1980]: 429–47). Their findings corroborate Antonio Palomino's 1724 account in part 3 of *El museo pictórico y escala óptica* (Madrid: M. Aguilar, 1988); see Antonio Palomino, *Lives of the Eminent Spanish Painters and Sculptors*, trans. Nina Ayala Mallory (Cambridge: Cambridge University Press, 1987), 164–66). Jonathan Brown considers this affirmation that the mirror image reflects the artist's canvas to be valuable (if not definitive) because Palomino could have talked with four of the nine individuals depicted in the painting (*Velázquez*, 257). See also Kemp, *Science of Art*, 104–8; John R. Searle, "*Las Meninas* and the Paradoxes of Pictorial Representation," *Critical Inquiry* 6 (spring 1980): 477–88; and Véronique Fóti, *Vision's Invisibles: Philosophical Explorations* (Albany: SUNY Press, 2003), 53–66.

18. Brown argues that measurements alone cannot resolve the issue: "Velázquez tempered geometry with intuition when he composed the picture. As the recent cleaning has revealed, there is a pentimento which runs along the entire length of the right-hand wall at the level of the cornice. At one point, this wall was a few centimeters higher than in the final version. The change in this crucial dimension should have forced Velázquez to rework the entire perspective if he had been following a fixed scheme. Instead, however, he made only this one adjustment" (*Velázquez*, 259).

19. Hubert Damisch, *L'origine de la perspective* (Paris: Flammarion, 1993), 454.

20. See Seidel, *Van Eyck's "Arnolfini Portrait,"* 188–98.

21. Brown, *Velázquez*, 260.

22. Velázquez is believed to have added the red cross on the painter's chest after earning a place in the military Order of Santiago through the king's support.

23. See Brown, *Velázquez*, 252–53.

24. Seidel, *Van Eyck's "Arnolfini Portrait,"* 193.

25. Louis Marin, *Le portrait du roi* (Paris: Minuit, 1981); Mitchell Greenberg, *Subjectivity and Subjugation in Seventeenth-Century Drama and Prose: The Family Ro-*

*mance of French Classicism* (Cambridge: Cambridge University Press, 1986); and Peter Burke, *The Fabrication of Louis XIV* (New Haven: Yale University Press, 1992), have made important contributions to our understanding of the role of the imaginary in the seventeenth-century monarchy.

26. Scholars have identified this room in the Alcázar Palace as one that Velázquez had remodeled next to his own suite of rooms (Brown, *Velázquez,* 256; Kemp, *Science of Art,* 107).

27. Ripa's *Iconologia,* originally published in 1593, and available in Dutch in 1644 (Cesare Ripa, *Iconologia, of uytbeeldingen des verstands,* trans. D. P. Pers [Amsterdam: Pers, 1644]), offered models for this and many other paintings.

28. Hessel Miedema notes: "The objects on the table have been interpreted as allusions to the academic program of training for painters: cloth, the texture and coloring of which can only be captured with the aid of a certain natural aptitude; drawing examples and the plaster cast of a face, to inculcate the necessary skill through practice and a book of theory—*ingenium, exercitatio,* and *doctrina*" ("Johannes Vermeer's *Art of Painting,*" in *Vermeer Studies,* ed. Ivan Gaskell and Michiel Jonker [Washington, D.C.: National Gallery of Art; New Haven: Yale University Press, 1998], 285).

29. Wheelock notes that the artist of the map is the distinguished Claes Jansz. Visscher, whose Latinized name, Nicolaum Piscatorem, Vermeer inscribed on the map's upper-right edge (*Vermeer and the Art of Painting,* 132).

30. For the ideological implications of mapmaking, see Tom Conley, *The Self-Made Map: Cartographic Writing in Early Modern France* (Minneapolis: University of Minnesota Press, 1996). See also Jeffrey N. Peters, *Allegorical Cartography in Early Modern French Writing* (Cranbury, N.J.: University of Delaware Press, 2004), 19–23.

31. Noting the word "Descriptio" prominently displayed on the upper border of the map, Alpers observes that mapmaking in the seventeenth century functions to "capture on a surface a great range of knowledge and information about the world" (*Art of Describing,* 122). Both map and painting were "additive works that could not be taken in from a single viewing point" (ibid.).

32. Ripa, *Iconologia* (1644), 338.

33. For more on the mask and the pamphlet, see Wheelock, *Vermeer and the Art of Painting,* 130 and 136.

34. Braider, *Refiguring the Real,* 177.

35. Arasse, *Ambition de Vermeer,* 134, cites Nicolas Poussin in André Félibien, *Entretiens sur les vies et les ouvrages des plus excellents peintres anciens et modernes* (Geneva: Minkoff Reprint, 1972), 282–83.

36. Daniel Arasse, "Vermeer's Private Allegories," in Gaskell and Jonker, *Vermeer Studies,* 342.

37. Alpers, *Art of Describing,* 49, citing Nicolas Poussin, *Correspondance de Nicolas Poussin,* ed. C. Jouanny (Paris: J. Schemit, 1911), 143.

38. Karl G. Hultén found that a pinhole is visible at the vanishing point, sug-

gesting that Vermeer used threads as an aid for reproducing proper perspective ("Zu Vermeers Atelierbild," *Konsthistorisk Tidskrift* 18 [1949]: 90–98).

39. Walter Liedtke, "*The Art of Painting,*" in Liedtke, Plomp, and Rüger, *Vermeer and the Delft School,* 397.

40. Arasse, *Ambition de Vermeer,* 139.

41. Jørgen Wadum, "Contours of Vermeer," in Gaskell and Jonker, *Vermeer Studies,* 212.

42. Wheelock, *Vermeer and the Art of Painting,* 14.

43. Wheelock suggests that the "explicitly unfocused drapery hanging over the front edge of the table" provides the most obvious clue that Vermeer used the camera obscura in this work (ibid., 138). Walter Liedtke lists the following qualities connected with the camera obscura: blurred contours, the halation of highlights, sudden shifts in scale, and intensified relationships of tone and color ("Genre Painting in Delft after 1650: De Hooch and Vermeer," in Liedtke, *Vermeer and the Delft School,* 156).

44. To read the map as a nostalgic element for Vermeer's contemporaries merely accentuates the illusionistic quality of the painting. But even if one were to consider the map as a contemporary reference for the painter in the painting, one would see in the vignettes that celebrate individual cities the same tendency toward official, selective interpretation.

45. In April 1667 French troops entered the Spanish Netherlands. Although they did not advance far, the invasion appeared menacing, especially after Lille fell to Louis in August. The following year Louis accepted the plan of the Triple Alliance (the Dutch Republic, England, and Sweden) formed to mediate the dispute between France and Spain. But Louis did not accept defeat, and maintained aggressive relations with the Dutch, ultimately reinvading the Netherlands in 1672 (Israel, *Dutch Republic,* 780–83).

## 3. *Permutations*

1. Foucault refers to the prevailing mode of knowledge and investigation in the classical period in terms of grammar and classification (*Mots et les choses,* chaps. 2–3). For Descartes, the equivalent grammar, or set of rules structuring knowledge, refers to the basic principles of geometry.

2. Steven Shapin and Simon Schaffer, *Leviathan and the Air-Pump: Hobbes, Boyle, and the Experimental Life* (Princeton: Princeton University Press, 1985), 51.

3. Catherine Wilson, *The Invisible World: Early Modern Philosophy and the Invention of the Microscope* (Princeton: Princeton University Press, 1995), 99.

4. Descartes likewise rejects established scholarly models, noting that having "already devoted" enough attention to ancient authors, he took the first opportunity "to escape the control" of his teachers (*Discours,* AT 6:6 and 9).

5. Lyons, *Exemplum,* 162.

6. Ibid., 165.

7. Ibid., 169.

8. Gilson, *Discours,* 234.

9. Ibid., 232–33.

10. Ibid., 189–90.

11. Ibid., 236–37; my emphasis.

12. Schouls further explains: "The supposition, in these cases, is the assumption of a hypothesis in the form of an equation or a set of equations, in which we work with symbols some of whose values we know and some of whose values we do not know, and in which the unknown values are to be determined through comparison or relation with the symbols whose values are known. The act of assuming the problem to be already solved occurs in introducing the symbols for which we do not yet have values, and the actual solving of the problem (if it can be solved) occurs in relating these symbols to those for which we do have values" (*Descartes and the Possibility of Science,* 124). Schouls notes that Descartes also introduces cases where "intellectual imagination supposes unknown quantities some of which cannot come to be known" (ibid.). I am simply underscoring the obvious point that something in this unknown quantity or idea has the potential of negating the truth produced through the assumption of an already known.

13. I thank J. Claude Evans for drawing my attention to this passage and for his insights.

14. A full catalog of inserted images includes a series of six landscapes: *The Glass of Wine* (c. 1658–60, Staatliche Museen Preussischer Kulturbesitz, Gemäldegalerie, Berlin); *The Concert*; *The Guitar Player* (c. 1670, Kenwood, England); *A Lady Standing at a Virginal;* and two in *The Love Letter* (c. 1670–72, Rijksmuseum, Amsterdam), one of which is a seascape. There are four religious paintings, including two of *The Finding of Moses* (in *The Astronomer* and *Lady Writing a Letter with Her Maid*), one *Last Judgment* (*Woman Holding a Balance*), and one *Christ on the Cross* (*Allegory of Faith* [c. 1671–74, Metropolitan Museum, New York]). The figure of Cupid appears, as mentioned previously, in two different works (*Girl Interrupted at her Music* and *A Lady Standing at a Virginal*); it was painted out of *Girl Reading a Letter at an Open Window* (c. 1657, Staatliche Kunstsammlungen, Gemäldegalerie, Dresden). One genre scene also occurs twice, that of the procuress (*The Concert* and *A Lady Seated at a Virginal*). There is one historical painting, a *Roman Charity* (*The Music Lesson*), and one portrait (*The Girl with the Wineglass* [c. 1659–60, Herzog Anton Ulrich-Museum, Brunswick]). There are two still lifes, one with musical instruments (*A Woman Asleep* [c. 1657, Metropolitan Museum, New York]), and another, very muted (*A Lady Writing* [c. 1666, National Gallery, Washington, D.C.]). Additionally, three works include landscapes painted on the covers of musical instruments: *The Concert, A Lady Standing at a Virginal,* and *A Lady Seated at a Virginal.*

15. Gregor J. M. Weber notes how Vermeer reformulates the same image, altering the dimensions and/or certain features of the original ("Vermeer's Use of the Picture-within-a-Picture: A New Approach," in Gaskell and Jonker, *Vermeer Studies,* 295–97).

16. Montias, *Vermeer and His Milieu,* 122.

17. Weber, "Vermeer's Use of the Picture-within-a-Picture," 297.

18. Chastel, *Fables, formes, figures,* 82.

19. Wheelock observes that the framed landscape "is rugged, in the manner of Jacob van Ruisdael" (*Jan Vermeer,* 120). Walter Liedtke also notes the distinction between idyllic and untamed landscapes ("Genre Painting in Delft after 1650: De Hooch and Vermeer," in Liedtke, Plomp, and Rüger, *Vermeer and the Delft School,* 163).

20. Wheelock explains: "The subject of this scene has often been thought to indicate the nature of the relationship of the three figures involved in the concert before it. These figures, however, are earnestly concentrating on their music, and do not, in themselves, reinforce the licentious nature of the scene portrayed on the wall" (*Jan Vermeer,* 120). See also Weber, "Vermeer's Use of the Picture-within-a-Picture," 302.

21. Schama, *Embarrassment of Riches,* 389. See also Schama's detailed account of Dutch household possessions (290–323).

22. Steadman, *Vermeer's Camera,* 102.

23. Wheelock, noting the elegance of the male figure's attire, suggests that he is "almost certainly not a music master. . . . He is an aristocratic gentleman, perhaps a suitor" (*Vermeer and the Art of Painting,* 87).

24. Steadman, *Vermeer's Camera,* 83–85. Steadman cites Lawrence Gowing, *Vermeer* (London: Faber, 1970), 121.

25. Wheelock, *Vermeer and the Art of Painting,* 85.

26. Ibid., 90.

27. Echoing Foucault's phrasing for *Las meninas,* Arasse argues that "le miroir de *La Leçon de musique* présente la représentation comme telle: ces personnages sont des modèles. Ils posent ou, plutôt, ils ont posé. Cette vue d'intérieur avec figures est une construction artificielle, *représentation d'une représentation*" [the mirror in *The Music Lesson* offers an example of representation: these figures are models. They are posing, or rather, they posed. This interior view with figures is an artificial construction, *a representation of a representation*] (*Ambition de Vermeer,* 67; my emphasis).

28. Steadman, who made a full-scale reproduction of the room for British television, notes: "One anomaly, however, is that the double shadows cast by the mirror in the reconstruction make much wider angles with the frame than those of the painting. The shadows of Vermeer's painted mirror are consistent with it hanging near to the vertical, as would be normal. In the model, however, the top of the mirror leans a considerable distance out from the wall. . . . It must be at

this angle in order for the relevant parts of the room to be reflected. Vermeer's rendering is therefore inconsistent. He wanted perhaps both to show a reflection of his own vantage-point by having the mirror lean forwards *and* to have the mirror appear to hang in a more normal, near-vertical position—requirements that are obviously not compatible in reality (although they are made to look so in the painting)" (*Vermeer's Camera*, 122).

29. Leonard J. Slatkes, "Utrecht and Delft: Vermeer and Caravaggism," in Gaskell and Jonker, *Vermeer Studies*, 86.

30. Liedtke proposes that the inserted painting suggests a correlation between Cimon's captivity and that of the gentleman imprisoned by love ("Genre Painting in Delft after 1650," 160). See also Arasse, *Ambition de Vermeer*, 72.

31. Lest we conclude that the classification of identities is a problem that might resolve itself over time, and that all the intricacies of the universe might eventually be contained in an expanded table housed in a supercomputer, consider Stephen Wolfram's claims (echoes of Descartes) that science should investigate simple rules rather than complex equations. Exploring possible patterns of black and white squares set out on a grid to conform to a rule that one invents (for example, a square should be the same color as the one above it unless that square has a black neighbor), Wolfram observes that of the 256 possible rules (elementary cellular automata) that one might devise, one alone "will cause the page to explode into complex, ever-shifting patterns." This pattern represents "a so-called universal computer, equal in its computational sophistication to Apple's jazziest laptop." The rule, however, also marks the limit of science: "Since no universal computer can outstrip any other, most things in the world are inherently unpredictable—'computationally irreducible.'" Quoted in Dennis Overbye, "Did This Man Just Rewrite Science?" *New York Times*, June 11, 2002, D1.

## *Conclusion*

1. Schouls, *Descartes and the Possibility of Science*, 78.

2. Ibid.

3. Dennis Des Chene offers a detailed analysis of Descartes's self-regulating machines, which originate the conditions necessary for their continuation (*Spirits and Clocks: Machine and Organism in Descartes* [Ithaca: Cornell University Press, 2001]).

4. Dumont, *Descartes et l'esthétique*, 121–22.

5. Dumont argues through reference to Queneau and the modern detective novel that authors who respect the same set of formal principles, finite in number, can produce an infinite number of plots (ibid., 123). The same, of course, was true for classical tragedy in its adoption of the three unities. The question becomes: Why adopt these rules, these parameters, and not others? What are the implications of this choice?

6. Yvon Belaval, *Leibniz critique de Descartes* (Paris: Gallimard, 1960), chap. 1. See Dumont, *Descartes et l'esthétique,* 122–23.

7. Dumont, *Descartes et l'esthétique,* 123–24. Dumont refers to Belaval.

8. Christopher Braider, "A State of Mind: Poussin's *Judgment of Solomon,*" panel, "Seeing Places," Modern Language Association, New York, December 2002.

9. Anthony Blunt contends that Poussin "made one inexplicable mistake in the composition by showing the wicked mother holding her own dead baby, whereas it is an essential point of the story that it should be in the hands of the good mother" (*The Drawings of Nicolas Poussin* [New Haven: Yale University Press, 1979], 62). Blunt suggests that in the hands of its own mother, the dead baby identifies and thereby incriminates her, while in the hands of the other woman, this corpse would suggest the humaneness of the mother who eventually prepares to sacrifice her own son. See also Tony Greene, "Solomon's Judgement," *Nicolas Poussin's Humour,* http://home.clear.net.nz/pages/tgreen/PsHum9.htm.

10. For more on associations of the detail with the inessential and the feminine, see Naomi Schor, *Reading in Detail: Aesthetics and the Feminine* (Methuen: New York, 1987).

11. Wheelock, *Vermeer and the Art of Painting,* 99. Summarizing the diverse opinions of art historians regarding Vermeer's insertion of the *Last Judgment,* Arasse concludes that no definitive interpretation is possible (*Ambition de Vermeer,* 58–61).

12. Wheelock refers to microscopic examination that reveals the scales to be empty (*Vermeer and the Art of Painting,* 98–99). Other scholars have argued that they suggest the act of weighing, and need not actually contain gold or pearls to do so.

13. Antonio R. Damasio, *Descartes' Error: Emotion, Reason, and the Human Brain* (New York: HarperCollins, 2000), 89, 101, 102.

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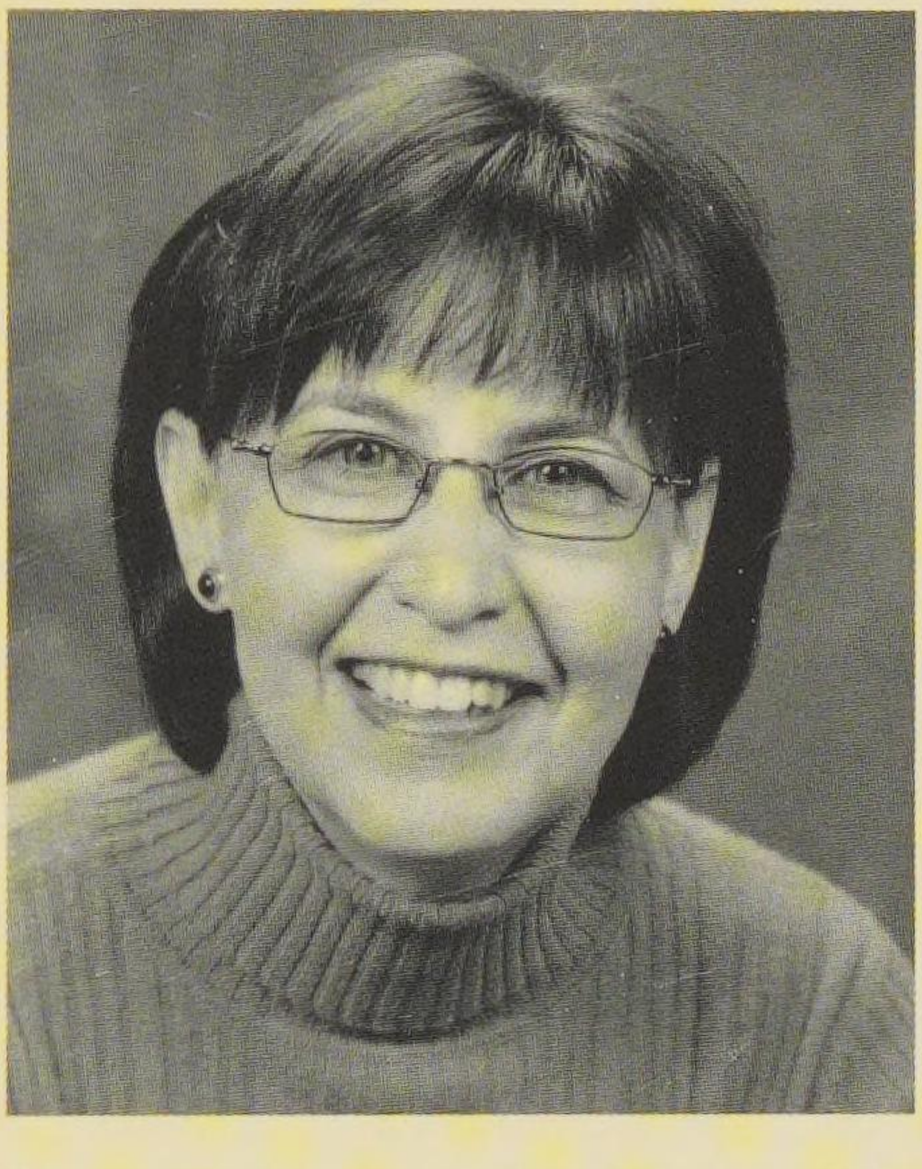

Harriet Stone is Professor of Romance Languages and Literatures and Comparative Literature at Washington University in St. Louis. She is the author of *The Classical Model: Literature and Knowledge in Seventeenth-Century France* and *Royal DisClosure: Problematics of Representation in French Classical Tragedy.*

*Jacket illustration:* Detail from *Woman Holding a Balance,* Johannes Vermeer, c. 1664. National Gallery of Art, Washington, D.C. Widener Collection.
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"*Tables of Knowledge* is one of the most original recent contributions to seventeenth-century studies. Harriet Stone's book presents in stunning juxtaposition Descartes's writings that revolutionized Western philosophy with Vermeer's stunningly transcendent paintings. Stone uses the hook of Holland—the country in which, without ever coming in direct contact with each other, these two titans lived—to draw her reader into an exploration of the ways Western perceptions of reality were gradually and inexorably being shifted from one representational universe to another. Informing her readings of Descartes and Vermeer is a solid grounding in seventeenth-century politics, theology, and culture. Stone's book interweaves literature, philosophy, art history, and visual studies. Her book's seduction lies in the ways this interweaving of discourses brings to the fore in the example of these two very different men the underlying epistemic changes that so intrigued Michel Foucault in his own analyses of the great shift in Western representation that occurs during the seventeenth century and that ushered in what we now call 'modernity.'"

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